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FELLOW OF THE COLLEGE; BEIT RESEARCH FELLOW; HONORARY ASSISTANT PHYSICIAN, ADDENBROOKE'S HOSPITAL, CAMBRIDGE.

THE subject selected for my lecture has a stage which is familiar to every member of the medical profession; on the other hand, our knowledge of the complete pathological processes of the disease is in many respects singularly inadequate. Although we are all familiar with that stage in the progress of a lobar pneumonia which occurs on the fifth to the seventh day of the disease, just before the crisis, the opportunity seldom occurs to make a complete pathological examination of the earlier or later stages. The clinical condition, when such an opportunity does arise, has been so different from that of the same stage of an uncomplicated lobar pneumonia that the criticism always can be made that the conditions found are not comparable in the two cases. Further, we still lack knowledge of the conditions which govern the distribution of pneumonic consolidation, why in one case broncho-pneumonia is produced and in another lobar pneumonia.

It is therefore eminently desirable to endeavour to obtain insight into the complete cycle of the pneumonic process by experimental methods, not only with regard to the phases of the struggle between the invading organism and the host, but also with regard to the conditions necessary for that struggle to take place.

Certain results of experimental work [1] may perhaps be applied to the elucidation of the conditions found in man. In order to justify any such application it is necessary to show that the affinity between the struggle in the experimental host and in man is a close one. The results of the earlier experimenters were from this point of view disappointing. It was shown soon after the discovery of the pneumococcus that the introduction of this organism into the blood stream or the peritoneal cavity gave rise to changes in the lungs, but these changes were so different from those commonly met with in the human subject that few conclusions applicable to the latter could be rationally drawn from them.

Introduction of the organism into the lung also gave unsatisfactory results, the lesions produced being of a broncho-pneumonic type scattered throughout the lung, which threw little light upon the lobar form of pneumococcal infection which is of particular interest from the clinical point of view. The first real advance in this matter was the production of lobar pneumonia in dogs by Lamar and Meltzer.[2] By insufflation of the lung after intubation of the larynx they were able to produce lobar consolidation strictly comparable in its pathological reaction to the human type.

Their experiments were confirmed and amplified by the work of Blake and Cecil [3] on monkeys, who also produced complete lobar consolidation by intratracheal injection. These experiments were all made with pneumococci of very high virulence.

VIRULENCE.

In any attempt to produce infective lesions by experiment, estimation of the virulence of the infecting organism is of the utmost importance; this is particularly so in the case of the pneumococcus because its virulence varies so greatly.

The authors mentioned above used organisms which answer the criterion that one-millionth of a c.cm. of an 18-hour broth culture killed mice when injected intraperitoneally; their method of obtaining such a dose was by successive dilutions in broth. This criterion is open to objection that the few organisms injected lie in a comparatively large volume of a nutrient fluid which is not rapidly absorbed and in which they can freely multiply, the host acting as a living test-tube. The method, therefore, does not give an accurate measure of the minimal lethal dose to mice.

The virulence or pathogenic power of an organism depends upon two factors which cannot be measured separately—namely, the invading power of the organism and the resisting power of the host. In order to obtain any measure of virulence it is therefore necessary to standardise as far as possible one of these factors—namely, host resistance. The measure then used is the smallest dose of the organisms which will cause death. It is therefore essential to employ a method which ensures immediate reaction between the attacking organisms and the defences of the body. The organisms must be denied all facilities for multiplying other than those provided by the tissues of the host. Multiplication of the organism in the broth introduced will give a virulence value which is not only high, but which is also liable to considerable variation depending upon the rate of absorption of the fluid. The mouse is an experimental animal which is eminently suitable for the measurement of pneumococcal virulence, owing to its high susceptibility, and if healthy mice whose weight lies within narrow limits are used, a fairly satisfactory stabilisation of the host factor is obtained. The possibility of vitiation of the measurement of the dose of the organism by multiplication in the fluid introduced can be obviated by dilution in normal saline, which is rapidly absorbed. Such dilutions must, however, be injected immediately as the pneumococcus rapidly dies in saline solution.

TITRE.

My own experiments have been almost entirely carried out with a single strain of pneumococcus whose virulence has been altered at will. For convenience the measure of virulence or titre has been taken as the logarithm of the reciprocal of the minimal lethal dose—that is to say, the titre being x the minimal lethal dose is then $1/10^x$. The actual dose given can be roughly estimated from the fact that an 18-hours' broth culture contains between 200 and 500 million organisms, or otherwise 2×10^8 to 5×10^8. The minimal lethal dose at titre 7, therefore, lies between 20 and 50 cocci only and titre 8 becomes an absurdity.

The experimental animal selected was the rabbit, an animal moderately susceptible to the pneumococcus, which fortunately proved very comparable to the human host in its relationship to infection.

LUNG STRUCTURE.

Before describing the experimental lesions obtained I must first mention a point in the structure of the mammalian lung which is of considerable importance in the consideration of the probable origin of such lesions. The bronchial tree is lined with ciliated epithelium up to its terminal branches. These finally end in one or two terminal bronchioles having non-ciliated epithelium, each of which opens into an alveolar unit consisting of various portions which have been accurately described by Miller [4] and named by him on the analogy of a classical house, the vestibule, the atria, and air vesicles with terminal pouches or air cells. Owing to the absence of ciliation of these terminal bronchioles any material which reaches into or beyond them is not removed but is speedily sucked in by the respiratory movements and is bound to become spread through the whole system. Such a terminal bronchiole with its air spaces may be termed an alveolar unit, and any infection which reaches it necessarily involves the whole unit. These terminal units not only occur at the end of terminal branchings, but are also given off throughout the bronchial tree, rising from the largest bronchi, usually being in pairs, and connected to such a bronchus by only a very small short ciliated bronchiole. (Fig. 1). The central part of the lung is composed of such units which are thus

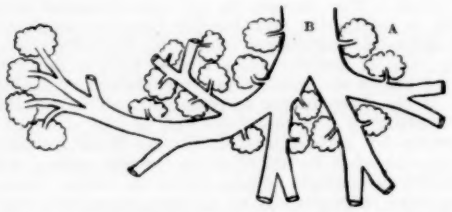
in very intimate connexion with the biggest bronchial tubes.

Owing to the respiratory to and fro current aided by the ciliary action of the epithelium, material lying in the large tubes is rapidly side-tracked into these central units. There is a great tendency for these small branchings consisting of a tiny bronchiole with two units attached to occur in whorls of three, a peculiarity of structure which explains the tri-lobed appearance of the consolidation not infrequently seen in broncho-pneumonic conditions.

EXPERIMENTAL METHOD.

The method employed in order to make certain of introducing pneumococci into the lung itself was to perform a tracheotomy and pass a soft rubber tube down the trachea as far as possible, the tube being of such size as to engage in the opening of the main bronchus to one lobe of the lung. The culture was then injected into the tube by piercing it with a fine injection needle. The material was then blown into

FIG. 1.



A diagram of the arrangement of the alveolar units round the larger bronchi. The alveolar units A arise directly from the largest bronchi B, and are thus in very intimate relationship with them.

the lung by means of a puff ball on the external end of the tube. It was found that by far the commonest site of any lesion produced was the lower lobe of the right lung, which is of interest because of the frequency with which this lobe is the site of pneumonia in man. The probable explanation in both cases lies in the fact that the bronchus of the right lower lobe is in the most direct line with the trachea.

By this method at least half of the culture injected is held to reach the lung itself, if, as became the rule, a volume of 1 c.cm. at least is injected. The loss, of course, occurs from material left behind in the tube and still adhering to its end when it is withdrawn. Infection of the tissues of the neck round the tracheal opening invariably occurred, but was of little moment, the wound healing rapidly in two to three days.

Over 80 experiments were performed with the Type I. pneumococcus, whose virulence varied from a titre of below 3 to one between 6 and 7. The nature of the lesion obtained was found to depend entirely upon the virulence of the organism used and not upon the dose given. This had already been indicated by the results obtained by Lamar and Meltzer.[2]

LESIONS PRODUCED.

Introduction of cultures into the lung with titre of below 4 produced only the most insignificant changes or none at all. With titre between 4 and 5 patchy lesions were produced which could be closely compared with human broncho-pneumonic lesions; with a titre of about 5 lesions of larger size were obtained, reaching from the centre of the lobe to the periphery, thus corresponding to a lobular distribution; with titres between 5 and 6 the whole lobe became involved and either a definite lobar pneumonia was obtained or the infection spread still further, involving all the thoracic serous cavities and giving rise to a double pleurisy and pericarditis. With a titre of 6 or over an entirely different type of lesion was produced with diffuse changes throughout all lobes of both lungs. This could be shown to be due to a rapid intense septicæmic invasion of the blood stream, and was comparable with the type of lesion obtained as the result of intravenous or intraperitoneal injection. It may therefore be called the septicæmic type of lesion or, on the analogy of tuberculous infection, miliary pneumonia (see table).

Titre.	M.L.D. mouse.	Lesion rabbit.	Distribution.	Reaction.	Minimal effective dose.
3–4	$1/10^3$	Broncho-pneumonia.	(*a*) Central; (*b*) Diffuse.	Catarrhal.	0·1
4–5	$1/10^4$	Lobular.	Pleurisy, local.	Catarrhal and Polymorph.	0·01
5–6	$1/10^5$	Lobar.	Pleurisy and pericarditis.	Polymorph.	0·001
6–7	$1/10^6$	Septicæmic.	Fulminating.	Serum and R.B.C.	0·0001

I will now describe the histological changes observed in each of these different types and at the same time suggest a possible explanation of their variation with rise of virulence. I will for the moment neglect the method of disposal of organisms whose titre is below 4.

BRONCHO-PNEUMONIA.

When organisms of about titre 4 are introduced into the rabbit's lung, they and the material in which they are introduced are speedily side-tracked by the respiratory current and ciliary movement into the nearest alveolar units. Frequently in my experiments the material has only reached the larger bronchi and has, therefore, been side-tracked into the central units in connexion with them, thus giving rise to a patchy central pneumonia (Fig. 2); if the material has spread more widely a diffuse broncho-pneumonia is produced (Fig. 3). The inflammatory reaction which takes place remains confined to the units thus invaded, which are often in the earlier stages clearly delineated by the consolidated area. Very few polymorpho-nuclear leucocytes come out into the area of inflammation, the exudate consists mainly of a serous fluid in which large cells with round or oval nuclei preponderate, having all the characteristics of alveolar

FIG. 2.

Rabbit. Central broncho-pneumonia. A localised central area of consolidation surrounds the main bronchus (B) for two-thirds of its circumference. A = artery, V = vein, B = bronchus. This figure and those following are drawn from a photograph of a cross section of the right lower lobe. The consolidated area shows up dark.

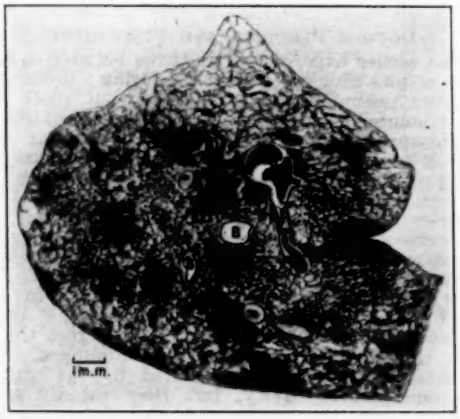
lining cells; the cells which are first cast off rapidly undergo fatty degeneration. It is only in the early stages that cocci in any quantity can be identified in such a lesion. They appear to have little power of multiplication and to be rapidly destroyed by the inflammatory reaction, though, as will be mentioned shortly, this destruction is not always complete.

Later the neighbouring alveoli begin to take part in the inflammatory action so that the unit outline becomes obscured. This peripheral reaction is always

sterile and consists of a greater or less amount of serous exudate with an intense proliferation of the alveolar lining cells, which often produce plaques of high epithelium so that the alveoli appear completely filled with large cells producing the catarrhal reaction which has been claimed to be characteristic of true broncho-pneumonia.

The capillaries of the consolidated patch become more and more engorged, reaching a maximum at about the fourth or fifth day. They then gradually become more inconspicuous and are often difficult to

FIG. 3.



Rabbit. Broncho-pneumonia. Scattered patches of consolidation are widespread, tending to group round central structures of lobe. Arteries tightly contracted. Lettering in Figs. 3, 4, 5, 6 as in Fig. 2.

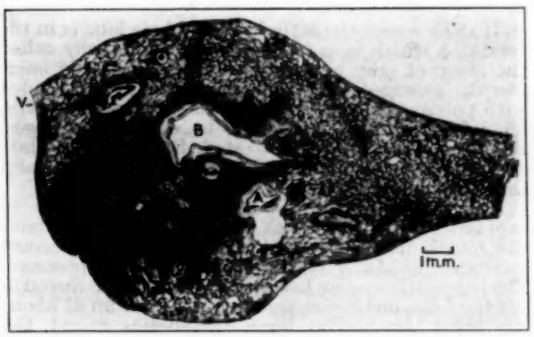
find on the seventh day. In the meantime the more fluid exudate becomes slowly absorbed by the local lymphatics; the cells thrown off earliest become disintegrated and the catarrhal increase spreads into the patch owing to the activities of the alveolar cells still remaining in situ, which are endeavouring to reclothe the damaged alveolar surface. These newly formed cells are continually being cast off, and at about the seventh day the consolidated nodule almost entirely consists of such cells and is almost entirely non-vascular. The process of absorption by the lymphatics is shown by a mild dilatation with a fairly intense aggregation of lymphocytes which may form regular perivascular cuffs round the small arteries in the patch.

One of the most striking characteristics of this low grade type of reaction is the complete absence of change in the bronchi and bronchioles, with the exception of the presence of exuded alveolar exudate in the small bronchiole of the patch and sometimes in the bronchus around its opening. With a lesion of this grade the animal often shows little sign of discomfort except for a transient rise of temperature for the first two or three days, slight distaste for food, and perhaps a little fall in weight. In a few experiments a second period of malaise has occurred on the fifth to seventh day. On killing the animal during this period, evidence of the occurrence of fresh lesions has been found, in which cocci have been identified, though they are not longer to be found in the original lesions. The reaction has been similar to that usually to be found on the second or third day. These experiments throw light on that low grade form of broncho-pneumonia which occurs in children, characterised by the successive appearance of fresh patches of lung infection which may even continue for as long as six months, Armstrong.[5] The explanation that they suggest is that the local defensive reaction in the original lesions has not been sufficiently intense completely to destroy the invading cocci. The material extruded from the small bronchiole thus contains living cocci which, in the endeavour of the bronchus to cleanse itself, are carried to fresh alveolar units into which they get side-tracked and there set up a fresh focus of infection. This would be especially liable to happen where patches of central consolidation existed whose tiny bronchioles open into the larger air tubes.

LOBULAR PNEUMONIA.

As the virulence titre of the invading organism is increased, though the initial states of the cleansing of the bronchi and the side-tracking of the infecting material are the same, the inflammatory reaction produced becomes both more extensive and more intense in nature. The power of the cocci rapidly to reproduce themselves is increased, so that they are much more easily found in the earlier stages, and are no longer confined by the limits of the alveolar unit, but spread directly into others lying around it. The nature of the inflammatory reaction is changed owing to an increase of the numbers of polymorphonuclear leucocytes and consequently a diminution in the preponderance of the larger alveolar cells. The serous exudate is increased and fibrin may begin to be formed in it. The capillaries again become more and more engorged up to about the fourth day, but then, especially in the centre of the patch, they become rapidly obliterated by the pressure of the exudate in the alveoli which are now not merely filled but widely distended by it. Though in the earlier stages the polymorphonuclear exudate is already beginning to take place, serum and desquamated alveolar cells, which are often fatty, at first predominate. It is during this early period that cocci are most conspicuous. Though the inflammatory patch has become much larger, its periphery is still similar to that of the smaller patch with catarrhal exudate taking place at a fairly early stage. These patches may become so large that they coalesce and thus form the more extensive lobular type of lesion (Fig. 4). At all stages, however, the original foci can be identified by the more intense nature of their reaction and by definite zoning round them. As has been already mentioned, the lobular lesions tended to occur with a titre of about 5. The bronchioles in the affected

FIG. 4.



Rabbit. Lobular pneumonia. Large area of consolidation extends from central bronchus to pleura (over which is dry pleurisy) with a smaller patch on opposite side. Vein (v) shows peri vascular infiltration.

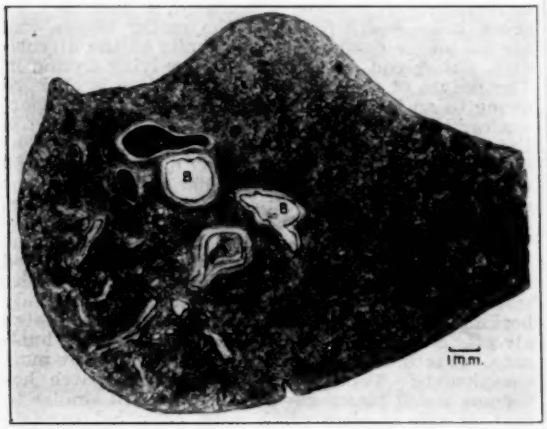
area now begin to show changes, losing their epithelium and often becoming difficult to distinguish from the surrounding consolidation. The intensity of the process of the removal of exudate by the lymphatic channels also increases so that the larger lymphatics round the larger vessels become conspicuous, being dilated with serum and débris. The perivascular lymphatic reaction which occurs in the later stages also increases in intensity.

LOBAR PNEUMONIA.

With a further rise of titre to a value of between 5 and 6, if a suitable dose is introduced, a lobar lesion is obtained (Fig. 5). The organisms have now a

much greater power of reproduction and invasion and spread rapidly throughout the lobe, being apparently able to keep in advance of the host's attempt to localise them by inflammatory reaction until the periphery of the lobe is reached. A lobar lesion 24 hours old shows the process clearly. Reaction is then still patchy and most intense at the centre of each patch, but the patches are rapidly coalescing by the junction of their peripheries where the exudate is almost entirely serous. It is in this peripheral serous

FIG. 5.



Rabbit. Lobar pneumonia. General consolidation of whole lobe except for a few atria. The lighter zone of perivascular infiltration is becoming conspicuous; epithelium of larger bronchi still intact.

exudate that by far the largest and most vigorous cocci are to be found. They are lanceolate in shape and stain deeply, while at the centre of the patch they are already beginning to be destroyed, being small, rounded, and often poorly staining. Polymorphonuclear reaction is now becoming intense at the centre of each nodule and soon spreads further and further, so that by about the fifth day the whole lobe is in the condition which is so familiar and is commonly called the stage of grey hepatisation, the lobe being enormously enlarged and the alveoli widely distended with polymorphonuclear exudate. By suitable staining with Sudan III. in order to show fat changes, zoning can still be demonstrated, the earlier exudate at the central foci being the more degenerate and showing greater fatty changes.

In this lobar form of lesion the distension of capillaries does not reach its maximum till about the fourth day, after which the capillaries become somewhat suddenly obliterated by alveolar pressure. The lymphatic system becomes widely dilated throughout the lobe, distension reaching a maximum at about the third day. The large lymphatics round the larger vessels are then extremely conspicuous, being often nearly as wide as the lumen of the blood-vessel itself. The bronchi and the bronchioles are now widely involved. Their epithelium becomes desquamated, they are filled with exudate, and merged into the general consolidation. These bronchial changes, however, occur later than those of the surrounding alveoli, and therefore appear to be secondary and not primary.

As has already been mentioned, cocci are most conspicuous at the spreading edge in the earliest stages. They can easily be found up to the third day, they are much more difficult to find on the fourth day, and by the fifth day they have practically disappeared. Attempts have been made to study the methods by which they have been dealt with, and two processes appear to take place during these earlier stages. The first of these is their destruction extracellularly in the alveoli; cocci tend to become agglutinated into little clumps, they stain more and more indistinctly, their staining portion becomes smaller and smaller till finally they disappear. The second process is a phagocytosis by polymorphonuclear cells, certain individuals of which become crowded with cocci. These tend to aggregate round the vessels and perivascular lymphatics and have also been found in the lymphatic channels and in the peripheral sinuses of the lymph nodes. Others have been found in the lumen of blood-vessels. These appearances suggest that certain polymorphonuclear cells after becoming filled with cocci leave the inflammatory area either by returning to the blood stream or by passing up the lymphatic channels to the lymph glands. This point will be referred to again later.

DOUBLE PLEURISY AND PERICARDITIS.

The earlier experiments at titres between 5 and 6 gave results which were very confusing; occasionally a lobar pneumonia was obtained, but more often the changes in the lung itself were incomplete and a widespread invasion of the serous cavities of the thorax took place. More accurate measurement of the dose of culture given gave the explanation of this. It was found that if the dose was too large double pleurisy and pericarditis was produced, but with the correct dose a lobar pneumonia. Both types of lesion were produced by suitable dilution of a single culture. The explanation appears to be that, if the dose is too large, the rapid spread of the invading cocci can no longer be limited by the pleural surface of the lobe, but cocci rapidly pass through into the pleural cavity in great numbers. Their progress still cannot be limited by the walls of the one pleural cavity, but they rapidly spread directly into the other and also into the pericardium. The reason why the changes in the original lobe do not assume the proportions found in lobar pneumonia is probably due to a lack of supply of sufficient polymorphonuclear leucocytes. Such enormous numbers are poured out into the three serous cavities that not enough are left to produce a true lobar distension. The pressure of the pleural exudates also tends to inhibit the filling of the lobe. A lesion of this type, though apparently so severe, does not by any means always cause the death of the animal. If the latter survives to the sixth or seventh day, cultures from all three serous cavities are usually sterile; the invasion, though so widespread, has been successfully dealt with.

MILIARY OR SEPTICÆMIC PHENOMENA.

In many experiments at this titre the animal does not, however, survive. A septicæmic invasion of the blood occurs and proves rapidly fatal, whether the lesion is lobar in type or takes the form of double pleurisy and pericarditis. The lesions characteristic of the septicæmic or miliary type have been described by M'Gowan and M'Neil [6] in very fatal epidemics which broke out amongst boys in certain reformatory schools. The characteristic pathological finding was an intense septicæmic invasion of the blood stream by the pneumococcus. Their sections were shown to the Pathological Society of Great Britain and Ireland in 1914. The lesions consisted of a patchy serous exudate into the alveoli, accompanied by desquamation of alveolar cells and often by small hæmorrhages with a complete absence of any polymorphonuclear reaction, but intense engorgement of capillaries and other vessels of the lung.

This description applies equally well to the conditions experimentally produced in rabbits by either the introduction into the lung of pneumococci of extreme virulence, titre 6–7, or the intravenous or intraperitoneal injection of cocci sufficiently virulent to kill the animal. (Fig. 6.) The condition has also been described by Armstrong and myself [7]; it almost always occurs in small children and is extremely fatal, death taking place within 48 hours. It probably occurs sporadically throughout the country. From the descriptions given, certain of Blake and Cecil's [3] experiments in monkeys also produced lesions which appear to have been of this type, death taking place early, with diffuse

changes throughout all lobes of the lung. They consider these cases to be merely extreme early examples of lobar pneumonia, but it must be remembered that changes of virulence were not accurately controlled in their experiments, so that the titre may well have been at times sufficiently high to produce a septicæmic lesion.

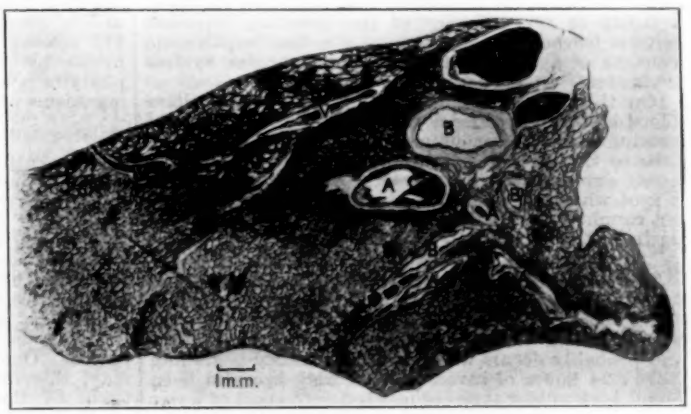
Changes of this type are usually present in the other lobes of the lung when septicæmia intervenes in a lobar pneumonia. Even when the titre is above 6, so that the septicæmic lesion is produced with extreme rapidity, the site of the original invasion can still be identified by a lesion demonstrating that an early attempt has been made by the host to destroy it. The alveoli at the original foci are distended with polymorphonuclear cells which have been extruded in the earliest stages of invasion and have even been successful in locally destroying the pneumococci. The contrast between the almost complete absence of cocci in these small foci and the immense numbers which swarm throughout the rest of the lung is very remarkable. There thus appears to be a critical time depending, at any rate partly, upon the power of rapid reproduction of the coccus, when the general defences of the body become completely paralysed and a "fulminating" condition arises in which the bacteria can riot unopposed.

LYMPHATIC DRAINAGE.

In a few experiments at the lobar titre another system became involved with extremely fatal results. Mention has already been made of the great distension of the lymphatics of the lung in the earlier stages of the more severe but still localised types of lesion. Though the lymphatic channels contain all sorts of débris which must have been derived from the alveoli of the lung, free cocci are, as a rule, completely absent, only an occasional polymorphonuclear cell contains them, and the contrast is great between the wide lymph channel and the alveoli next to it, in which free cocci are numerous. Occasionally an intense invasion of the whole lymphatic system has taken place and the picture is reversed. Extremely large, deeply staining, lanceolate diplococci swarm throughout the lymphatic channels and show up much more conspicuously than the cocci in the alveoli, which are small and poorly staining. There thus appears to be usually a great power of resistance to invasion appertaining to the lymphatic system, even in its smallest channels. A critical point can, however, be reached with a sufficiently virulent organism, when this resistance completely breaks down, just as is the case with the blood stream.

These results are, perhaps, of wider and more general application. They indicate that the swelling of the lymph gland, which belongs to any inflamed tissue, is usually caused by débris drained from the part affected, which is in itself sterile, except for the presence of organisms which, as a rule, are safely enclosed in leucocytes and become filtered out in the peripheral sinuses of the lymph gland. Such organisms are mostly killed by the leucocytes; if all are destroyed the gland subsides without breaking down, but if some are successful in destroying their host the gland then suppurates. Occasionally, however, an infection is of such virulence that the power of resistance of the peripheral lymphatics becomes destroyed. The lymphatic system draining the part undergoes a true invasion and an acute lymphangitis takes place.

FIG. 6.



Rabbit. Miliary pneumonia (septicæmic). Small hæmorrhages widely scattered, a specially large one (H¹) just below the largest artery, above and to the left of which is an incomplete serous œdema filling the more central alveoli. Arteries and veins engorged, bronchi intact. The hæmorrhages H are shown on the accompanying tracing (6A).

FIG. 6A.

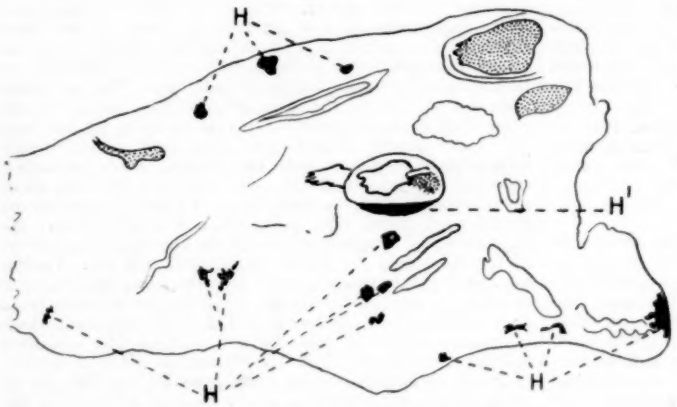


Diagram of Fig. 6 showing the hæmorrhages (H).

INVASION OF THE BLOOD STREAM.

I have also arrived at a similar view with regard to the presence of cocci in the blood stream. Throughout these experiments blood cultures have always been made at whatever stage the animal is killed, and in all the more severe forms of lesion blood films have been examined. In all experiments where definite lesions have been obtained and the animal has been killed on the first or second day, blood cultures have been positive. By the fifth or sixth day, even when the lesion is severe, the blood culture has almost always been sterile. Thus organisms are always present in the blood at the earlier stages.

In order to be found in film they must, of course, be present in very considerable numbers. By methods of dilution, &c., I have endeavoured to correlate the findings in film and culture, and have found, when culture methods show that cocci are sufficiently numerous to make it reasonable to expect to find them in film, that first, all cocci found are within leucocytes; and secondly, that the numbers found in film are much greater than culture methods would indicate. It is only when counts begin to reach values

of 500,000 to 1,000,000 cocci per c.cm. that free pairs begin to appear in film. This would indicate that in the blood stream also the invasion is not a true one when the virulence of the organism is below a certain value, but that all organisms present are contained within leucocytes. The disproportion in count and film would mean that the great majority of such enclosed cocci are non-viable. The suggestion can therefore be made that a bacteriæmia, which is so commonly present in the earlier stages of many diseases and in which considerable quantities of blood must be taken for a positive culture to be obtained, consists of the presence of the invading organism within leucocytes only, whereas a true septicæmia consists of an invasion of the blood stream by free organisms.

On this line of argument the value of a positive blood culture as evidence that the path of invasion of the lung in lobar pneumonia is by the blood stream falls to the ground. Metastatic foci of infection are easily explained by it. A metastatic focus is merely a spot where a bacterium-laden leucocyte happens to get caught up when the bacteria gain the victory and destroy the host.

PLEURISY.

The relationship of pleurisy to lung lesion has been found to vary very considerably. The intense form of double pleurisy and pericarditis which occurs with titres of high virulence has already been described, and probably occurs with extreme rapidity beginning within 24 hours of invasion. Pleurisy has also been found with milder types of lesion due to cocci of lower virulence in connexion especially with the lobular type of lesion. In its mildest degree it consists of a patch situated over a lobular lesion which has just reached the surface; the patch then has been found to be sterile at all stages. When the lung lesion is larger, the pleurisy, though local, is sometimes infected, but usually when this takes place the whole pleural cavity soon becomes involved and considerable effusion takes place. A lobar lesion has also been obtained accompanied by unilateral pleurisy with effusion. The evidence tends to show that such lesions, restricted to one pleural cavity, take place some time after the initial invasion and that cocci persist in them after they have been destroyed in the lung.

PERICARDITIS.

In a few experiments the pericardium alone has become infected, both pleural cavities escaping. The relationship of the root of the lung to the pericardium is very close, and an infection, mainly localised to the central region of the lung near the root, can reach the surface where it lies against the pericardium and directly invade this cavity. Such pericarditis, if recovered from, would give rise to adherent pericardium, which suggests that certain cases of this condition may arise from a pneumococcal infection by way of the lung.

MINIMAL EFFICIENT DOSE.

I have already mentioned that my experiments confirm those of Lamar and Meltzer,[2] who claim that the type of lesion does not alter by increasing the dose; the exception which proves this rule being the production of lobar pneumonia and double pleurisy and pericarditis at the same titre. One point with regard to the dose introduced into the lung is, however, most important; at any particular titre a sufficient dose must be given or no lesion will be produced. This minimal dose diminishes rapidly with rise of titre (see table). Its value at titre 4 is approximately 1/10 c.cm. and at titre 5 1/100 c.cm. and at titre 6 1/1000 c.cm. It therefore follows that in nature it is much easier for an organism of high titre to infect the lung. This perhaps throws light upon the rarity of pneumococcal broncho-pneumonic lesions in adult man; the defences of the pulmonary system and its cleansing power are so great that it is almost impossible for an organism of a virulence such as should produce broncho-pneumonia to make good any invasion. Only when the host defences are destroyed by some such process as a severe cerebral lesion can sufficient material obtain entry. An experiment of Lamar and Meltzer bears upon this point. They found that by cutting the left vagus they could produce lesions in a dog's lung with doses which, in the intact animal, had no effect.

In experimental work it is most important to use a method which will introduce the culture right into the lobe of the lung. The cleansing power of the trachea is enormous, and the experimental results are quite uncertain if the culture is, for instance, injected into the trachea just below the larynx, unless comparatively enormous volumes are used. For similar reasons, any attempt to produce pneumonia by introduction of cultures into the naso-pharynx is almost bound to fail unless large doses of organisms of extremely high virulence are introduced.

CRISIS.

An explanation of the remarkable phenomenon which occurs in lobar pneumonia, known as the crisis, may now be attempted. I have already stated that cocci have practically disappeared from the lung on the fifth day, but are usually easy to find in the more severe lesions until then. Now, the chief toxin of the pneumococcus is an endotoxin which is only liberated when the cocci are killed. There is thus an increasing liberation of endotoxin up to the fifth day, but after that the supply practically ceases. One of the factors determining the crisis may, therefore, be the final neutralisation of endotoxin by the defences of the body 48 hours later on the seventh day. Another extremely interesting phenomenon has been demonstrated by Armstrong.[3] He has shown that in lobar pneumonia the protective power of the serum, which is extremely slight at the onset of the disease, practically vanishes after 24 hours and remains absent for the first four days. On the fifth day it suddenly reappears and increases enormously and with great rapidity to a maximum on the seventh or eighth day. It then slowly diminishes throughout convalescence. The rapid rise of this power to destroy pneumococci coincides with the crisis. The combination of these two processes thus affords some explanation of the regularity with which crisis occurs on or about the seventh day.

LOW VIRULENCE ORGANISMS: TERMINAL PNEUMONIA.

Investigations are also being pursued in order to attempt to find out the way in which the lung deals with organisms of low virulence. One of the most remarkable, and in a way surprising, results that has been obtained is the uniform failure to produce lesions in the rabbit's lung at titres of 3 or less. The evidence that I have up to the present obtained supports the view that such organisms are looked upon by the lung as of no more importance than any other débris which may be drawn into the alveoli, such as carbon pigment. The cocci become ingested by the large alveolar cells and are destroyed in them, no aid being summoned from the polymorphonuclear cells. No experimental method of lowering the resisting power of the host has yet been attempted, but Dr. Whittle has, in my laboratory, been approaching the problem of the nature of terminal broncho-pneumonia from the clinical side. He has found that the differentiation of pneumococci of low virulence from the common salivary streptococci of the throat is often a matter of great difficulty, being only possible by the use of some arbitrary criterion, such as bile solubility, the criterion which he has finally fixed upon. He has also found that using this criterion, many terminal pneumonias appear to be due to salivary streptococci and not to pneumococci. The true pneumococcus of low titre is more frequently found in such conditions as chronic bronchitis. He is inclined to believe that the statement that over half the dwellers in our large cities have pneumococci in their throats is an erroneous one, due to the inclusion of many salivary streptococci among the pneumococci identified. I have performed a few experiments with streptococci, and have been able to produce lesions in the rabbit

in all respects similar to those produced by pneumococci. It is thus possible that many terminal pneumonias are streptococcal in origin, not pneumococcal.

OTHER TYPES OF PNEUMOCOCCUS.

All the work hitherto described has been done with the single strain of Type I. pneumococcus. I have been endeavouring to reproduce the results with strains representing Type II., Type III., and the inagglutinable Group IV. With the latter, which was obtained in pure culture from a case of penophthalmitis and had a titre of 5, the range of lesions produced with the Type I. organism have been fairly accurately reproduced; the titre of the organisms required to produce any lesion such as double pleurisy and pericarditis is, however, slightly lower than that necessary in the case of Type I.

Unexpected difficulty was found with the Type II. and Type III. organisms. Not only was it impossible to raise them to a titre higher than 5 by mouse passage, but even when at their highest titre it was impossible to kill rabbits by intraperitoneal injection, which can be done with certainty with the Type I. organism. At this titre the most extensive lesion that could be obtained in the rabbit's lung was of lobular type, and the lesions were on the whole of a lower grade than those of Type I. at a corresponding titre. These organisms thus appear to have a lower pathogenic power both to mice and rabbits, and, if these experiments can be applied to the case of human infections, it would help to explain the great prevalence of Type I. organisms in the more severe lung lesions.

Dr. Whittle has also been attempting to correlate the titre of organisms obtained from human lung lesions with the experiments I have described. He has found, in agreement with other observers, that by far the greater number of pneumococci associated with severe human lesions are of Type I., and that a very close correspondence can be shown to exist between human and experimental rabbit lesions at any particular titre, lobar lesions in man being associated with titres from 5 to 7 and broncho-pneumonic lesions with titres below 5. With lesions of low grade, where the titre of the organism is also low, Type I. is comparatively uncommon. In order to make the analogy closer we have introduced a number of these organisms into rabbits' lungs and have obtained a close correspondence in each experiment to the human lesion from which the strain was obtained.

Dr. Whittle has also had the opportunity of examining strains from a considerable number of cases of pneumonia, extending over nearly two years, which have occurred in a somewhat isolated village near Cambridge; the outbreak has therefore been of the nature of an epidemic. The titre of the strains recovered has been remarkably constant, and the numbers of the inhabitants of this village, being comparatively small, it has been possible to draw up a scheme of the paths infection has probably taken. In this instance a pneumococcus of high titre has therefore been definitely traced from case to case by actual direct contact. These results open up the prospect of control of pneumococcal infection in so far as lobar pneumonia in the healthy adult is concerned, and point very strongly to the necessity of the isolation of this type of disease. The occurrence of pneumococci of titre 5 or over in the human throat is undoubtedly very uncommon; the organisms with pneumococcal reactions, which are present, are almost always of quite low titre.

SUMMARY.

My endeavour in this lecture has been to put before you certain experimental facts which can, I think, be legitimately applied to man. They show that the titre of the infecting organism is all important, and that this determines both whether a lesion will be produced at all and what the nature of that lesion will be. Lobar pneumonia in the healthy adult is due to organisms of titres between 5 and 7, which are otherwise comparatively rare. The deduction may be made that it is spread by direct contact infection passing from throat to throat, though very possibly intermediate carriers are often concerned. I must apologise for having concentrated mainly on my own work, and for not having attempted any comprehensive review of the literature of the subject and the value of the work of many other observers, so I hope you will forgive me for perhaps dwelling overmuch upon the details of experiments which have been my chief interest for the last seven years.

The following is a summary of conclusions which I think can be made.

1. Experiments with the pneumococcus on rabbits show a sufficiently close analogy to its effects on man to justify the application of the results obtained to human disease.

2. The estimation of the virulence of the infecting organism is of the utmost importance. The virulence titre can be conveniently measured in mice.

3. Organisms whose titre is below 3 have no pathogenic value in the healthy host.

4. Organisms of titre 4 produce broncho-pneumonic lesions.

5. Organisms of titres between 4 and 5 produce lobular lesions.

6. Organisms of titres between 5 and 6 produce either: (1) lobar pneumonia, or (2) general infection of the thoracic serous cavities.

7. Organisms of titres between 6 and 7 produce either: (1) lobar lesions, which become septicæmic; or (2) the septicæmic or miliary lesion.

8. The septicæmic lesion is the form always produced by a true blood infection.

9. If a lesion is produced a temporary bacteriæmia always occurs in the early stages.

10. An effective dose diminishing with rise of titre must reach the lobe of the lung for a lesion to be produced.

11. The lymphatic system is as a rule sterile, except for organisms enclosed in leucocytes, while engaged in draining away the débris of the inflammatory reaction produced.

12. Any breakdown of this protective power causes a true lymphangitis and makes the prognosis very grave.

13. The reaction in broncho-pneumonia is often of a grade insufficient to completely destroy invading organisms, some of which escape into the bronchi and are carried to other parts of the lung producing fresh foci of infection. This gives an explanation of relapsing broncho-pneumonia.

14. Lobar pneumonia in the healthy adult is due to organisms of titres between 5 and 7 which are otherwise comparatively rare. The deduction may be made that it is spread by direct contact, infection passing from throat to throat, though very possibly intermediate carriers are often concerned.

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MINOT-MURPHY LIVER DIET IN ADDISONIAN ANÆMIA:

REPORT OF TWO CASES.

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Addisonian anæmia calls for Heraclean courage on the part of the physician. Any measure, therefore, which helps in the fight against this disease is worthy of consideration and wide trial. Minot and Murphy [1-5] in America have described a diet which has given good results in their hands, the improvement lasting in certain cases as long as three and a half years, which is the length of time the treatment has been in use. Briefly, they give large amounts of mammalian liver, cooked and raw, with plenty of vegetables and fresh fruit, but little fat.

The method was brought to our notice by a letter from a former dietitian at Ruthin Castle who accepted a post in the Massachusetts General Hospital, Boston, and to whom fell the duty of administering the diet in a number of Dr. Minot's cases. This lady has published a paper setting forth the diet tables and cookery which had been found most useful.[2]

Two cases were then treated on these lines at Ruthin Castle, and the results are set out below.

CASE 1.—Male, aged 49. Two great-aunts died from Addisonian anæmia. Three years ago had sore tongue, breathlessness on stairs, and pain in left side; treated with hydrochloric acid and improved. Two years ago pallor and loss of energy and strength; slight exertion caused palpitation and breathlessness. Red count 1,800,000.

TABLE I. (Case 1).

Date in 1927.	Hæmoglobin (per cent.).	Red cells (in millions).	White cells.	Colour-index.	Nucleated reds per 100 whites.	Macrocytes.	Microcytes.	Poikilocytes.
May 20th	40	1·16	2000	1·7	0	+	+	+
June 2nd*	40	1·10	2200	1·8	1	+	+	+
,, 3rd	41	1·25	2600	1·7	2	+	+	+
,, 8th	31	1·14	2200	1·4	0	+	+	+
,, 27th†	28	0·90	2200	1·6	0	+	+	+
July 2nd	38	1·18	4600	1·6	—	—	—	—
,, 18th	70	2·80	5200	1·2	—	—	—	—
Sept. 3rd	103	4·40	6200	1·2	0	0	v.f.	0

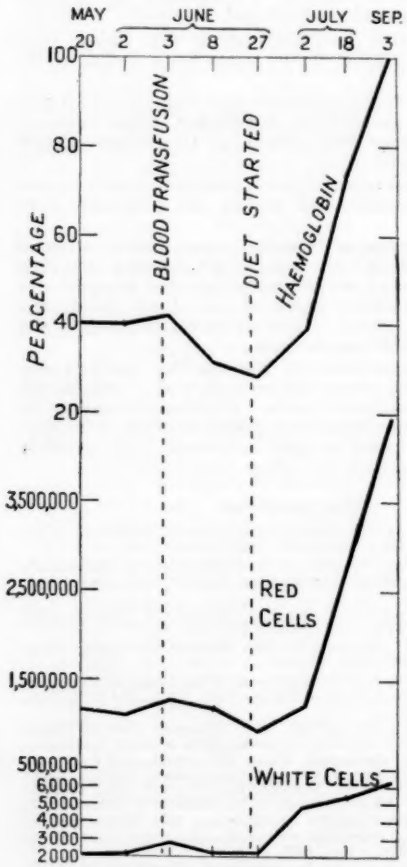
* Blood transfusion.
† Minot-Murphy diet begun. v.f. = Very few.

Recovered with arsenic, rest, and fresh air. Six months before admission, pallor, dyspnœa, and weakness returned, and did not yield to treatment so readily. Admitted Ruthin Castle, May 19th, 1927. Lemon yellow colour, pale conjunctivæ, weak, sore tongue, palpitation and breathlessness on least exertion, confined to bed. Blood hæmoglobin 40 per cent., red cells 1,160,000, white cells 2000, no nucleated red cells, but megalocytes, macrocytes, microcytes, and poikilocytes present. Fractional test-meal showed achylia. Patient was treated with rest, fresh air, arsenic injections, and acid drink by mouth, but went steadily down hill. Transfusion of citrated blood produced only slight temporary improvement, and in view of a severe reaction (rigor, temperature 105° F., pulse 160, cyanosis and disorientation) was not repeated On June 27th feeding with liver was commenced, and within a few days the patient felt better and his blood condition improved, as is seen in Table I. The figures are represented graphically in Fig. 1.

Present condition (Sept. 3rd).—Good colour, appetite normal, no breathlessness, can walk upstairs two steps at a time, and is back at work. There is occasional tingling in the fingers and the tongue is a little sore at times.

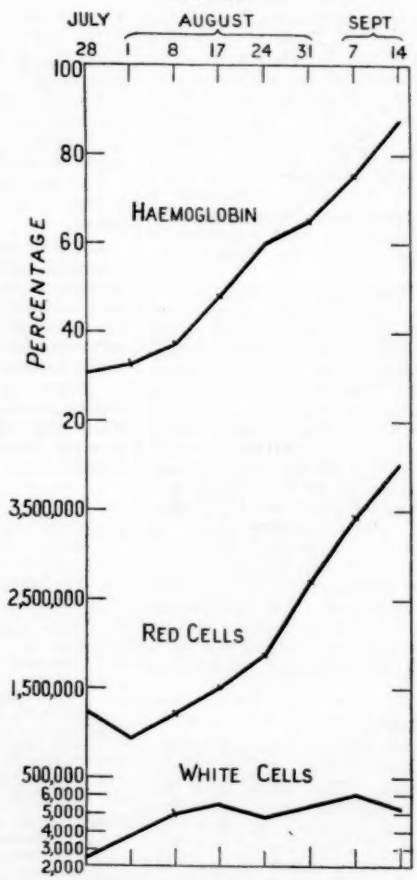
CASE 2.—Female, aged 63, no known anæmia or subacute combined degeneration in family. Twelve months ago began to be easily tired, sore tongue, made sick by food, breathless, palpitation. Bed ever since, treated with iron and arsenic in various forms. Admitted Ruthin Castle July 26th, 1927, lemon coloured, pale conjunctivæ. Circulatory system: Soft systolic bruit at apex, extrasystoles every five–six beats. Blood: Hæmoglobin 31 per cent., red cells 1,200,000, and white cells 2200; colour-index 1·3, nucleated red cells, macrocytes, microcytes, and poikilocytes present. The average red cells were normal in size, but many were elongated (a point stressed by Prof. van den Bergh at the recent meeting of the British Medical Association

FIG. 1.



Changes in the blood in Case 1 after blood transfusion and on liver diet.

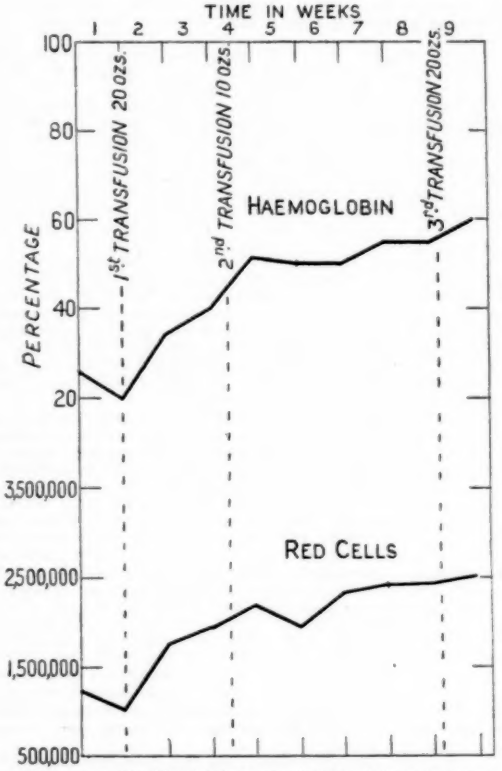
FIG. 2.



Changes in the blood in Case 2.

in Edinburgh). No reticulated red corpuscles were seen. A fractional test-meal could not be done as patient vomited the tube even after the throat was anæsthetised. The fæces contained anaerobic Gram-positive rods regarded as *Bacillus welchii*. Patient was treated with rest, fresh air, liver diet, arsenic injections, and acid drink by the mouth. With the exception of the diet these therapeutic measures had been tried in various forms during the previous 12 months. The blood changes are shown in Table II. and Fig. 2.

FIG. 3.



Changes in the blood after repeated blood transfusion.

Present condition (Sept. 14th).—Good colour, appetite normal, can walk half a mile daily without breathlessness or palpitation, tongue not sore, heart quiet and regular.

TABLE II. (Case 2).

Date in 1927.	Hæmoglobin (per cent.).	Red cells (in millions).	White cells.	Colour-index.	Nucleated reds per 100 whites.	Macrocytes.	Microcytes.	Poikilocytes.	Reticulated red cells per 500 red cells.
July 28th	31	1·20	2200	1·3	2	+	++	++	0
August 1st	33	0·90	—	1·8	0	+	++	++	0·9 %
,, 8th	37	1·18	4800	1·6	0	+	++	++	1·2 %
,, 17th	48	1·50	5400	1·6	0	++	+	+	3·0 %
,, 24th	60	1·86	4700	1·6	0	++	(+)	+	1·2 %
,, 31st	65	2·70	5300	1·2	0	—	—	—	0·9 %
Sept. 7th	75	3·40	6000	1·1	0	v.f.	few	inf.	0·9 %
,, 14th	87	4·00	5000	1·1	0	v.f.	v.f.	inf.	—

v.f. = Very few. inf. = Infrequent.

Fig. 3. is included for comparison, as it shows the rate of improvement of the blood in a case which did well with transfusions. This case was reported by one of us recently.[3]

It is obvious that, although the blood began to recover within a few days of giving the diet, we may in each case be dealing with a remission. We have, however, seen many remissions in this disease, and are of opinion that these patients have improved more definitely and rapidly than is usual. Further, Case 1, a medical man, had already had the experience of three remissions, and he has no doubt that his recent improvement has a character of its own.

In the belief that the diet has given valuable help to these patients, we make this communication with the object of encouraging a wider trial.

A full account of the régime, with typical diets, is given by Miss E. A. Nicholls in the paper referred to above, and by Miss Thelma Tubbs and Miss Elizabeth Bellinger.[4]

The dietetic treatment may be summarised as follows:—

Mammalian liver essential: Calves', beef, pigs', from 90 to 240 g. (3 to 8 oz. cooked weight) daily.

Encourage: 1. Kidneys. 2. Chicken livers. 3. Red meat (without the fat)—beef, lamb, mutton, calves' or ox heart. 4. Fruits (fresh, tinned or dried, up to 12 oz. a day): Oranges, grapefruit, raisins (steam until soft before serving), prunes, strawberries, peaches, apricots, or pineapple. 5. Vegetables (cooked or raw): Lettuce, cabbage, spinach, tomatoes, asparagus, or other vegetables.

Permit: One egg, milk (half a pint), tea, cocoa. Toasted wholemeal bread, plain biscuits. Potatoes, macaroni, cereals. Sugar not to exceed 20 g. (¾ oz.) a day. Pickles, relishes, salt, and vinegar. Poultry. Fish. Shell-fish.

Avoid: Fats, not to exceed 70 g. (2½ oz.) a day. Bacon, pork. Butter. Cream. Cheese. Oils, olive oil in dressings, &c. Nuts.

In our patients the liver was taken in the following forms: Lightly roasted, almost raw in sandwiches, underdone in soup, and as a cream. Two full days' diets are set out hereunder:—

Diet I.—Breakfast: Fruit juice; porridge; boiled egg; toast, butter, marmalade; coffee, milk.

11 a.m.: Raw beef and liver sandwiches.

Lunch: Fried liver, onion, and tomatoes; macaroni; spinach; salad; fresh fruit; toast.

Tea: Biscuit; jam; fruit; fruit salad and raisins.

Dinner: Vegetable soup with scraped raw liver; underdone chop or steak or liver; rice pudding with raisins; orange salad or fruit.

Diet II.—Breakfast: Fruit; porridge; toast, butter; coffee, milk.

Lunch: Fried liver; tomato, onion; green vegetables; rice pudding with raisins: stewed fruit; toast, butter, milk.

Tea: Biscuits; jam; fruit; tea and milk.

Dinner: Vegetable soup with raw scraped liver; fish; meat or liver dish; green vegetables; milk pudding; stewed or fresh fruit.

Our thanks are due to Mr. J. G. S. Jeffery, B.Sc., and Mr. A. J. Leigh, B.Sc., who made the blood estimations.

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HEALTH MINISTER'S VISIT TO LANCASHIRE.—Mr. Neville Chamberlain recently visited some of the principal institutions administered by the Manchester Corporation. He said he believed in seeing the great centres of local government for the sake of getting into touch with local administration and feeling, and so that the administrators of local government might themselves understand what he was endeavouring to bring about. He also inspected the District Council's housing scheme at Ormskirk, and cut the first sod of the £30,000 sewage scheme of the West Lancashire Rural District Council at Maghull, near Liverpool. Speaking at Ormskirk on the reorganisation of Poor-law institutions, he said that there were thousands of beds empty in these buildings, whilst there were queues of people waiting to get into voluntary hospitals. What was needed was a reorganisation of the institutions under the guardians and those belonging to the municipalities.

BLOOD TRANSFUSION IN SPRUE.

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IN the later stage of sprue a blood picture very like that seen in pernicious anæmia often develops. This hæmolytic type of the disease is very dangerous and often fatal.

A detailed account of the blood in such cases was given by one of us (G. C. L.) as long ago as 1912.[1] It was there pointed out that in the later stages it might be practically impossible to differentiate the blood picture of sprue anæmia from that of true pernicious anæmia. On this picture some have argued a relationship between the two diseases, or even their identity, but sprue is a definite entity with a symptomatology and pathology of its own and is not pernicious anæmia.

Transfusions of whole blood have been used for some time in pernicious anæmia, septicæmia, loss of blood from hæmorrhage, often with very beneficial results, and recently a patient suffering from the hæmolytic type of sprue was transfused with whole blood just before coming to us. Under our treatment the sprue improved and he apparently completely recovered, but after leaving us and living at home for some time he relapsed and again developed a very severe type of anæmia. We therefore took him back into the Hospital for Tropical Diseases and, his wife being a suitable donor, her blood was used for the transfusion.

A Short Résumé of the Cases.

CASE 1.—European male, aged 58. Residence abroad, India and Mesopotamia. Previous illnesses: enteric fever, 1888; dysentery, 1890 and 1895.

Sprue began in 1917, with light-coloured stools and sore tongue, and persisted in spite of various methods of treatment. During this time patient was residing in Canada and England. By 1923 the disease had so progressed that the patient was admitted to a general hospital in England, his blood count reading: red cells 600,000, hæmoglobin 22 per cent. Three whole blood transfusions performed during a period of 27 days resulted in a rise of the red cells to 800,000, hæmoglobin 27 per cent. Four months later the count read: red cells 1,460,000, hæmoglobin 56 per cent.

When transferred to the Hospital for Tropical Diseases, London, on April 10th, 1924, he was still very ill and wasted. Weight 6 st. 12 lb., and the blood count was red cells 2,440,000, hæmoglobin 65 per cent. With our usual line of treatment he improved so much that he was able to leave hospital on August 1st, 1924, his weight having risen to 11 st. 1 lb., and the count to red cells 4,160,000, hæmoglobin 80 per cent.

During the following two years the patient returned to hospital twice for short periods of treatment, his blood having, on the occasion of the first readmission, fallen to red cells 2,000,000 and hæmoglobin 60 per cent., but on each occasion the anæmia responded to treatment.

On July 7th, 1926, the blood count had fallen to red cells 3,000,000 and hæmoglobin 75 per cent.; poikilocytosis and nucleated red cells were present, but after readmission to hospital on that date the decline continued in spite of the usual methods of treatment, until August 6th, 1926, when it was decided to transfuse with blood in the hope of checking it. The count on that day was red cells 2,300,000 and hæmoglobin 65 per cent.

The wife acting as donor, 700 c.cm. of whole blood were given by the citrate method. No rigor occurred, but the transfusion was followed by a rise of temperature to 100° F. Three days later a further decline had taken place, the count reading red cells 2,000,000, hæmoglobin 65 per cent., and a trace of albumin was found in the urine. By Sept. 7th following—that is, a month later—the red cells totalled 4,200,000 and hæmoglobin was 80 per cent., and the patient was discharged in the following week with a count of 4,700,000 red cells and 85 per cent. hæmoglobin, feeling much better in every way. He has reported at intervals since his discharge and was keeping well up to September, 1927.

[1] Jour. of Trop. Med. and Hyg., 1912, xv., 129.

An even more striking case is the following:—

CASE 2.—Mr. X., an old case of sprue, who had never been very anæmic, went home to Scotland. Apparently he relapsed there and rapidly deteriorated, his blood count falling and his general condition becoming alarming. It was then decided, though the risk was considerable, to bring him to London, where he arrived on the morning of Oct. 2nd, 1926.

Previous Illnesses.—Malaria and dysentery, 1888; syphilis and gonorrhœa, 1891; hepatitis, 1902; cholera, 1917. Ptomaine poisoning, 1919. Had lived in India and New Zealand.

Present Illness.—In 1920 diarrhœa began, with light-coloured stools, sore tongue, and loss of weight, the onset of sprue, so in 1921 he returned to England.

On Dec. 8th, 1922, patient was admitted to the Hospital for Tropical Diseases, after seeing one of us, and he had to return to hospital on five subsequent occasions. On each of these he responded to treatment for the sprue with varying success, and when in hospital the specific infection was treated with potassium iodide, N.A.B., and bismuth. On May 20th, 1926, he was discharged from hospital to spend the summer in Scotland, his red cells numbering 4,500,000; hæmoglobin 85 per cent.; weight 13 st. 12 lb.

The following September (1926) he relapsed so rapidly that on Oct. 1st the task of bringing him from Scotland to London was one of considerable difficulty and risk. For three days before the commencement of the journey he had been vomiting continuously and was only conscious at intervals. His medical attendant (Dr. W. Telfer, of Greenock) and nurse must be commended for their success in bringing a patient in such a critical condition safely through such a long journey by train.

On his arrival at the Hospital for Tropical Diseases at 8.45 A.M. on Oct. 2nd in an unconscious condition, 10 oz. of 5 per cent. glucose saline solution were at once administered intravenously. The blood count on admission was: red cells 940,000, hæmoglobin 20 per cent. As no return to consciousness or marked improvement followed the glucose injection, it was decided to transfuse with whole blood, and at 2.15 P.M. 730 c.cm. of citrated blood was given. The effect was dramatic. As the patient's colour improved he regained consciousness, recognised doctor and sister, and was talking naturally before the transfusion was finished.

At 3.45 P.M. the patient asked for some Benger's food and no vomiting followed. The transfusion was followed at 4.15 P.M. by a rigor and a rise of temperature to 102° F. at 6 P.M., falling to 98° F. at 11 P.M. The following day he had so much improved that it was difficult to imagine he had been so ill on arrival. The temperature rose again (102° F.), and after swinging for the next few days gradually reached normal. There was no more vomiting and the diet was gradually extended.

On Oct. 4th, two days later, the red cells were 1,000,000 and the hæmoglobin 25 per cent. On Oct. 10th the red cells were 2,130,000 and the hæmoglobin 50 per cent., and thereafter the improvement was steadily maintained.

On Feb. 10th, 1927, the patient had picked up from his wasted condition. Seventeen days after admission his weight had been 12 st. 7 lb., and by the date of discharge it had reached 14 st. 2 lb. At the same time the blood showed 5,240,000 red cells and 95 per cent. of hæmoglobin. Up to the time of writing he has had no relapse.

The following, a somewhat similar case, is also interesting.

CASE 3.—European male, aged 67. Residence in India for 43 years. Family history good, no asthma. Previous illnesses: measles, mumps, varicella, enteric fever (at 14 years), malaria; no definite history of dysentery.

In 1920 diarrhœa commenced with flatulent dyspepsia, and was diagnosed as colitis. Improvement occurred on return to England on holiday, but on the voyage to India again in 1925 the diarrhœa recommenced, and for the year previous to admission to the Hospital for Tropical Diseases the stools had been white and bulky.

On entering hospital on July 5th, 1927, he was very wasted and anæmic, and his tongue was glazed and flabby and sore; the abdominal wall was wasted, but the abdomen was not distended; the liver was slightly diminished and he showed a typical picture of severe sprue. Blood count on admission was red cells 2,540,000, hæmoglobin 65 per cent.; weight 7 st. 3 lb. Urinary analysis: specific gravity 1010, otherwise normal. Wassermann negative. No ova or protozoa in stools.

As he did not progress under the usual treatment, and as four days later it was found that the red cell count had fallen to 2,020,000, it was decided to transfuse with whole blood.

The patient was found to belong to group III., a suitable donor was procured, and on July 12th, 1927, the patient's serum was tested against the donor's blood and no incompatibility was noted. The citrate method was used,

with all the usual precautions, the blood being given by the needle and funnel method into the right cephalic vein. Transfusion was started at 2.30 P.M. and at once symptoms of hæmolysis and anaphylaxis manifested themselves. The needle was at once withdrawn, not more than 5 c.cm. having been given. The symptoms, in order of appearance, were: coughing, nausea, flushing; coldness of the skin, which became clammy, cyanosis of lips, vomiting, pulse accelerated but regular and feeble, severe pain in lumbar region; diarrhœa and shivering. The diarrhœa and shivering persisted at intervals till 5 P.M. At 6 P.M. the temperature had risen to 102° F., but by then his condition had improved. The following morning he was much better, he had had some sleep during the night, and was able to take fluids. No micturition occurred till 5.30, an interval of 26½ hours after the commencement of the transfusion, and then he passed 5 oz. of smoky urine containing albumin, a few red blood cells, hæmoglobin, and both blood and hyaline casts. He continued to make satisfactory progress. Six days later: red cells 2,200,000, hæmoglobin 65 per cent., albumin and granular casts present. Ten days later: red cells 3,040,000, hæmoglobin 70 per cent. Twenty-one days later: red cells 3,840,000, hæmoglobin 75 per cent., albumin, no casts. Forty-one days later: red cells 4,460,000, hæmoglobin 85 per cent., albumin, faint trace. The weight was 7 st. 13 lb., a gain of 10 lb., and he was able to walk a little in the ward. His progress is still satisfactory.

Case 1 is interesting as showing how useful transfusion can be in the most advanced cases. A red count of 600,000 with 22 per cent. hæmoglobin indicates a condition from which few could hope to recover. After the transfusions the patient kept well until three years later, when another transfusion became necessary. Up to the present this patient maintains satisfactory health (one year later). Three years is the longest period that has elapsed since transfusion in any of our sprue cases, but there is reason to expect that some of our later cases may recover completely, and require no further transfusions.

Case 2 is an example of the dramatic effect sometimes attained by transfusion. The rapid recovery from unconsciousness and the subsequent steady improvement greatly impressed all who saw the case, and convinced them that transfusion is essential in all such severe cases.

Case 3 presents many features of interest, the chief being: (1) the occurrence of the hæmolytic and anaphylactic symptoms, although no incompatibility was noticed when the bloods were previously tested; (2) the rapid recovery from the sprue condition though so small an amount of blood had been injected.

Conclusions.

Blood transfusion has now been established as a most important method of treatment in sprue. It would appear that the amount of blood given is not the important factor, though in cases like No. 1, where the patient's blood had fallen to a dangerously low level, a large amount of fresh blood would undoubtedly be a distinct benefit. The important factor seems to be that the blood injected stimulates the blood-forming tissues of the body. How this takes place is a matter for further investigation, but the blood seems to act in somewhat the same manner as do proteins injected in "protein shock" treatment.

In patients who have sustained a slight rigor or pyrexia following transfusion, the beneficent results appear to be as good and perhaps even more rapid in their appearance than in those cases where no rigor or pyrexia has appeared.

Cases of hæmolysis or anaphylaxis are fortunately rare. Case 1 had no symptoms, although the second transfusion, given three years after the first, might have caused them. Case 3 gave no history of previous injection of serum or protein and had no asthmatic history, and yet such severe symptoms occurred that life was only preserved by the prompt recognition of the onset of anaphylaxis and hæmolysis and immediate cessation of the transfusion.

As regards the treatment of sprue generally, several points of interest may be mentioned: first, the use of liver extracts in the form of liver soup; and secondly, the use of the so-called pulvis bataviæ. Recently Dr. George Minot, of Boston, in an address delivered before the American physicians, claimed that liver, and especially a fractional alcoholic extract thereof, is a specific in the treatment of pernicious anæmia. In the discussion that followed Dr. Bailey K. Ashford pointed out its remarkable efficacy in the treatment of the so-called "pernicious anæmias" of sprue. The use of liver in sprue goes back for 30 years or more. Castellani states that it is an old native remedy in Ceylon. It was extensively used by Sir Patrick Manson, and one of us (G. C. L.) has also used it for the last 20 years in an extensive practice of this disease. Though no very startling results can be claimed for it, it does seem to do good, and there is no reason why it should not, as the liver is shrunken in sprue and very probably does not secrete properly. We may, then, by giving liver extracts, supplement this deficiency.

Batavia powder is a specially prepared organic compound of lime, with traces of iron and manganese. It contains no vegetable matter. It is the ancient "Peter Sys's cure," which was used extensively in Singapore in the old days. Originally supposed to come from cuttle-fish bones, it is now prepared from ordinary lime and is a proprietary preparation still. It may act by supplementing the deficiency of lime which is present in the disease, but it also seems to act beneficially in controlling the diarrhœa. It may be given in 1 drachm doses twice or three times a day and continued until the stool becomes solid and well formed. It seems to have a real use in the treatment of the disease.

PERNICIOUS ANÆMIA,

WITH SPECIAL REFERENCE TO *BACILLUS WELCHII* AS THE CAUSAL AGENT.*

BY STANLEY DAVIDSON, B.A. CAMB., M.D., F.R.C.P. EDIN.

(*From the Department of Bacteriology, University of Edinburgh.*)

IN 1888 William Hunter[1] published in THE LANCET his famous paper, in which he stated that pernicious anæmia was caused by a toxin elaborated in the intestine. Since then numerous theories have been advanced as to the cause of this disease, but the question is still unanswered to-day. In view of the recent revival of interest in Germany and America in the intestinal toxin theory, it would seem desirable to review briefly the arguments in its favour.

(1) *Clinical Signs.*—Starting at the oral end of the alimentary tract with sore tongue and gastric achylia and ending at the rectum with the discharge of peculiar chrome-coloured fæces, we have evidence of an abnormal condition of the gastro-intestinal tract.

(2) *Pathological Findings.*—As far back as 1860 Flint[2] noted changes in the mucous membrane of the stomach. These have been confirmed by Fenwick,[3] Osler,[4] and many other workers. Similar organic changes have been described more recently in the wall of the small intestine.

(3) *Bacteriological Findings.*—The abnormality of the flora found throughout the whole length of the gastro-intestinal tract supports this theory. Bacteriological evidence will be found later in this paper.

(4) *Evidence of a Chronic Intoxication.*—Moench, Kahn, and Torrey[5] state: "The qualitative effect on the blood and blood-forming organs, the symmetrical cord lesions, the degenerative atrophy of the mucous membrane of both stomach and small intestine, the endotheliolytic manifestations, all without conspicuous loss of weight, seem to be evidence of some undiscovered toxic agent assailing continuously and over a long period of time tissues which give rise to symptoms only when seriously and irreparably

* The work here recorded was done under the auspices of the Medical Research Council. The report was read in substance at the meeting of the British Medical Association at Edinburgh, July, 1927.

damaged. The vagueness of the history of early pernicious anæmia, characteristically a syndrome of increasing listlessness, indefinite nervous symptoms, complaints occurring in fourth and fifth decade, and in association with achylia, has been observed often enough in the early course of the disease to suggest pernicious anæmia, even without the characteristic blood changes. An onset of this character out of which the features of pernicious anæmia eventually emerge in itself suggests a toxic influence, unremitting and of extreme chronicity, to which the body reacts ineffectually."

The possibility that an undiscovered specific intestinal organism may be the causal agent has induced many workers in the past to make most careful qualitative examinations of the intestinal contents of persons suffering from pernicious anæmia. These efforts have always failed. In my opinion, this was to be expected, because I believe that chronic intoxication from the intestinal tract is the result, not of any unknown organisms, but of an abnormal situation and excessive numbers of organisms normally found in any healthy intestine.

In order to test this hypothesis I have elaborated a technique by means of which an actual quantitative estimation of the main groups of intestinal flora in a sample of fæces can be obtained. As this work is being published elsewhere, no details of the method will be given in this paper.

Quantitative Estimation of the Intestinal Flora.

A comparison of the intestinal flora of cases of pernicious anæmia and healthy subjects, if made qualitatively, would yield no information of value, since in both cases *Bacillus coli*, streptococci, and *Bacillus welchii* are found. When a quantitative examination is made, valuable information is forthcoming. Comparing the fæces of 30 cases of pernicious anæmia, with 33 samples from healthy persons, I found on the average that in pernicious anæmia the streptococci are increased from 100 to 1000-fold, the *B. coli* from 1000 to 10,000-fold, and the *B. welchii* from 100,000 to 1,000,000-fold. These results fully confirm the findings of Moench, Kahn, and Torrey.

This non-proteolytic fermentative flora, containing a very high proportion of viable organisms, is typical, and found in every case of pernicious anæmia.

Bacteriology of the Small Intestine.

I believe that this flora is found in the small intestine, and that the absorption of toxin takes place at this situation. We must remember that absorption is at its greatest in the small bowel, and would be correspondingly increased if the mucous membrane was damaged. Furthermore, the hydrogen-ion concentration is at the optimum for the production of "Welch" toxin, and in actual practice I find the *B. welchii* to be mainly in the vegetative and not in the spore stage in this situation.

It is impossible to examine the ileal contents in cases of pernicious anæmia, but for the following reasons it seems fair to assume that this abnormal flora exists in this situation. From examination of the total intestinal tracts of animals we find that, starting from a sterile duodenum, we reach the lower ileum where streptococci and moderate numbers of *B. coli* and *B. welchii* are found. In the colon these organisms are far more numerous. The greater the number found in the colon, the greater the number in the ileum. This has been confirmed by me on human beings at operations of the small intestine.

Examination of the stomach and duodenum in cases of pernicious anæmia shows an abnormal flora; the contents, instead of being sterile, show great numbers of organisms normally found only in the lower ileum and colon—i.e., streptococci and *B. coli*, sometimes one and sometimes the other predominating. These findings have been repeatedly confirmed, and are probably the result of achylia.

Van der Reis,[6] in 1922, by a special apparatus examined the contents of the small intestine in 19 cases of pernicious anæmia, and reports an invasion of organisms which are normally found only in the colon. Finally, Seyderhelm,[7] in order to confirm these findings, established an ileostomy in ten cases of pernicious anæmia, and reports that a brown fluid was evacuated which could not be distinguished from stool in appearance, odour, or bacterial content. It may safely be concluded, therefore, that from the stomach to the rectum there exists in pernicious anæmia a great quantitative increase of streptococci, *B. coli*, and *B. welchii*.

The Causal Organism.

Whether the intoxication is the result of all three organisms or of one particular organism is still unsettled. William Hunter believed the streptococcus to be the cause. Many workers blame the colon bacillus. Dr. A. F. Hurst, in his remarks at the meeting of the British Medical Association at Edinburgh in July, held both responsible, and dismissed *B. welchii* as having nothing to do with the condition. Herter, Moench, Kahn, and Torrey, and others, including myself, believe that the Welch bacillus is the most probable causal organism, for the following reasons:—

(1) While all these groups are greatly increased in numbers, *B. welchii* shows by far the largest increase.

(2) *B. welchii* is one of the most powerful hæmolytic agents known. The streptococcus found in pernicious anæmia, as well as in healthy subjects, is an enterococcus, and is never, in my experience, hæmolytic. The same applies to the colon bacilli. The majority are non-hæmolytic, while some show a weak hæmolytic action quite incomparable to that of *B. welchii*.

(3) On experimental evidence.

(*a*) B. S. Cornell injected[10] sublethal doses of *B. welchii* into the tip of the spleen of rabbits, and produced in every case an anæmia varying from a mild chronic condition to a very acute severe anæmia. The anæmia was similar in every way to that found in pernicious anæmia. The injection of hæmolytic streptococci or *B. coli* failed to produce an anæmia.

(*b*) Kahn and Torrey[8] injected monkeys intravenously with Welch toxin, and produced all the blood changes which are considered typical for pernicious anæmia. After three weeks the monkeys developed complete antitoxic immunity, further injection of toxin failing to produce any anæmia.

(*c*) Kahn and Torrey,[9] in order to overcome this immunity, gave monkeys Welch toxin by the mouth, and found that the toxin was either destroyed or not absorbed through the normal mucous membrane. Accordingly they damaged the mucous membrane of the stomach of the monkeys with sodium fluoride, and fed the monkeys through a stomach-tube with 20 c.cm. of fluid culture of *B. welchii* at weekly intervals. A very severe anæmia resulted, indistinguishable from pernicious anæmia. Moreover, no immunity resulted when the culture was given via the stomach. This is a very important point, and may explain the lack of reaction on the part of the tissue of patients suffering from pernicious anæmia.

The *B. welchii* produces a true exotoxin and a hæmolysin. A qualitative examination of 30 different strains of *B. welchii* by Dr. J. M. Alston and myself, both by the fermentation method of Simonds and by hæmolytic tests, shows that *B. welchii* from normal intestines and animals does not differ from *B. welchii* isolated from cases of pernicious anæmia. I agree with Moench, Kahn, and Torrey that if a Welch bacillus is the cause of pernicious anæmia, it is so, not because it differs qualitatively from other Welch bacilli, but because of the great increase in numbers.

It is now well recognised by clinicians that the finding of achlorhydria is essential before a diagnosis of pernicious anæmia can be made. It has, however, never been settled whether the achlorhydria is produced by the factors which cause pernicious anæmia or whether it is the primary ætiological factor itself. I am in favour of the latter view, since it is well recognised that a proportion of achlorhydric

patients after many years develop pernicious anæmia; 4 per cent. of apparently healthy individuals have been shown to have a complete lack of hydrochloric acid in their stomachs, and yet only a very small fraction ever develop pernicious anæmia. Achlorhydric patients may continued for years or throughout life in reasonable health, provided that the liver is destroying the toxins absorbed from the small intestine. As soon as the liver begins to fail, a chronic train of symptoms is produced which, after many years, may develop into pernicious anæmia.

Summary.

1. Clinical symptoms and pathological findings support the view that pernicious anæmia is caused by an absorption of toxin from the intestinal tract.

2. A bacteriological examination of both small and large intestine shows a non-proteolytic fermentative flora which is typical for pernicious anæmia. A qualitative examination shows the organism to be similar to those found in health. A quantitative examination shows an enormous increase of viable organisms, particularly in regard to *B. welchii*.

3. Biological and experimental evidence points to the *B. welchii* as the most probable causal agent.

Conclusion.

Weighty evidence has accumulated that pernicious anæmia is due to the absorption of a toxin from the intestinal tract, and the possibility that the *B. welchii* is the ætiological agent is well worthy of the further investigations which are proceeding in this laboratory.

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1. THE LANCET, 1888, ii., 556, 608, and 654; 1900, i., 221; 1903, i., 367.
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7. Ergeb. d. inn. Med. u. Kinderh., 1922, xxi.,361; Klin. Woch., 1924, iii., 568.
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10. Jour. Infect. Dis. 1925, xxxvi., 508.

THE LOCAL ORIGIN OF THE INCREASED BACTERICIDAL POWER OF THE BLOOD

FOLLOWING ULTRA-VIOLET IRRADIATION OF THE SKIN.

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IT has been shown that irradiation of the skin with ultra-violet rays increases the bactericidal power of the blood.[1] The conclusions from these experiments indicated that the optimum bactericidal response was obtained by the application of the minimal erythema dose of light, and with irradiation of a surface area of skin equivalent to 20–30 sq. cm. per kg. weight.[2] Since the blood of the general circulation increased its bactericidal properties after irradiation of the skin, a series of experiments was designed to determine whether this phenomenon originated at the site of irradiation, or whether it was due to some secondary reaction of the whole organism. Two series of experiments were carried out, so as to examine at the same time the blood circulating through the area of irradiated skin and the blood of the general circulation. The skin of the hind limb of the cat and the skin of the rabbit's ear were selected as having a blood-supply which could be readily isolated.

Irradiation of the Skin of the Hind Limb of the Cat.

It has been shown that irradiation of the abdominal skin of the cat with a quartz mercury-vapour lamp increases the bactericidal power of the shed defibrinated blood tested in vitro.[3] A similar experiment was carried out, but in this case the skin of the hind limb of a cat was irradiated. The result of this experiment can be followed from the following table:—

TABLE I.—*Average per cent. Hæmobactericidal Power of Sample of Sterile Defibrinated Blood collected from the Jugular Vein of a Cat and Tested with a Culture of Staphylococci.*

		Per cent.
(1) Before shaving right hind limb		74
(2) After shaving right hind limb		66
(3) ½ hour	after irradiation of limb with the M.V.L. for 15 min.	85
(4) 1 ,,		84
(5) 1½ hours		88
(6) 2 ,,		93
(7) 2½ ,,		93

A similar series of experiments were carried out with the hind limb tightly ligatured, so as to arrest the circulation directly after irradiation. No increase in the bactericidal power of the blood samples collected from the jugular vein was observed. The result of this experiment indicates that the increased bactericidal power following irradiation of the skin must be due to changes which develop with the circulation of the blood through the irradiated area. Experiments were therefore carried out to examine the blood which was flowing through the irradiated limb. A cat was anæsthetised with ether, and the hair of the hind limbs was shaved and the common femoral arteries and veins were dissected out. Excluding these vessels, each limb was tightly ligatured, so that blood was only entering the limb from the artery and returning by the vein. The right and left femoral veins were temporarily clamped so that blood samples could be collected, and a sample was taken from the jugular vein. The skin of the left hind limb was then irradiated with a mercury-vapour lamp (200 volts D.C., K.B.B. type) for 15 minutes, and at intervals blood samples were again collected from each of the veins. The bactericidal power of all the blood samples were tested against staphylococci in the usual way. The blood flowing through the irradiated limb had an increased bactericidal power after irradiation, while the blood samples from the non-irradiated limb and the jugular vein were unchanged.

TABLE II.—*Average per cent. Hæmobactericidal Power of Blood Samples collected from—*

	Jugular vein %.	Rt. F.V. % (non-irrad.)*	Lt. F.V. % (irrad.). †
After anæsthesia	80	—	—
Directly *before* irradiation of the skin of the left hind limb	85	83	87
Time after irradiation of the skin of the left hind limb:—			
20 minutes	88	82	99
60 ,,	80	81	96
95 ,,	78	81	100

* Right femoral vein (non-irradiated limb).
† Left femoral vein (irradiated limb.)

This experiment (Table II.) shows that the blood returning from the "irradiated limb" has an increased bactericidal power compared with the blood in the jugular vein and in the control limb which was treated in the same way, except that the skin was not irradiated.

Hæmobactericidal Changes following Irradiation of the Rabbit's Ear.

The hair was removed from the ear of a rabbit two days prior to each experiment by means of a depilatory (barium sulphide). Blood samples were collected from the lateral ear veins of both ears, and the inner and

[1] Colebrook, Eidinow, and Hill: Jour. Expt. Path., 1924, v., 54.

[2] THE LANCET, 1926, ii., 645.

[3] Hill and Eidinow: Practitioner, August, 1925.

outer surfaces of the right ear were then exposed to a mercury-vapour lamp, 6 in. distant, each surface for ten minutes. Blood samples were again collected from each ear at intervals after irradiation, and the bactericidal power of the blood samples collected were examined in the usual way. The results of these experiments showed that (1) the blood samples obtained from the irradiated ear had a higher bactericidal power than those from the non-irradiated ear; (2) the blood from the irradiated ear showed an increased bactericidal power in a shorter time than the "control" ear.

TABLE III.—*Average per cent. Hæmobactericidal Power (tested with Staphylococci) of—*

	Blood samples from lateral vein of the— Irrad. ear.	Non-irrad. ear.
Before irradiation	51%	52%
35 min. after irradiation ..	51%	48%
105 „ „ ..	90%	65%

As a variation of this experiment (Table III.), the right ear of a rabbit was irradiated and clamped at its base directly afterwards. Blood samples were collected from the left ear vein before and after the right ear was irradiated. The bactericidal power of all the blood samples tested remained unchanged during the whole experiment.

In another series of experiments the blood-supply to the ears was isolated so that the blood flowing through the ear and returning by the lateral veins of each ear could be examined. A rabbit was anæsthetised by intraperitoneal injection of urethrane. The central artery and veins of each ear were dissected, the central vein was ligatured, and a clamp was placed on the artery. By releasing the clamp on the artery samples of the blood flowing through each ear were obtained when required. The skin of the left ear was exposed to a mercury-vapour lamp, 8 in. distant, for 20 minutes. The animal was kept in the hot room at 37° C., as it was noticed that the ears otherwise became cold. Blood samples were collected from the irradiated and non-irradiated ears, and the bactericidal power of each sample was tested by the usual method. The result of these experiments can be followed by reference to Table IV.

TABLE IV.—*Average per cent. Hæmobactericidal Power (tested with Staphylococci) of—*

	Samples of blood collected from lateral vein of— Irrad. ear.	Non-irrad. ear.
Before irradiation	35%	38%
5 min. after irradiation ..	49%	34%
45 „ „ ..	90%	25%
55 „ „ ..	87%	38%
100 „ „ ..	71%	46%
180 „ „ ..	94%	47%

The results of these experiments indicate that when the skin is exposed to sources of ultra-violet rays a bactericidal effect is produced in the blood at the site of irradiation, and this is carried to the general circulation. Repeated experiments have given constant results. It has not been possible to isolate a definite substance with bactericidal power.

All experiments carried out in vitro with irradiated skin have so far failed to demonstrate a substance which will on injection into an animal increase the bactericidal action of the blood. There are, however, many observations which support the view that the irradiated skin is more resistant than normal skin to the inoculation of micro-organisms and to toxins (i.e., vaccinia, &c.).

Conclusion.

The results of these experiments indicate that the erythema dose of light applied to an area of skin increases the bactericidal properties of the blood flowing through the site of irradiation, and in this way the blood in the general circulation develops a greater bactericidal activity.

CHRONIC INFLUENZAL FIBROSIS OF THE LUNGS.*

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AFTER separating out from chronic diseases of the lungs those caused by tuberculosis, syphilis, and the inhalation of dust, there remains a considerable number of cases in which the lungs show signs of permanent damage in the form of fibrosis, more or less bronchial dilatation, and possibly thickened pleura. These cases are diagnosed under various names: unresolved pneumonia, chronic pneumonia, interstitial pneumonia, fibroid lung, fibroid phthisis, &c. They have occurred much more frequently since the great epidemic of influenza in 1918–19, and in my experience now form the largest class of chronic lung disease, outnumbering even tuberculosis. They are more often mistaken for tuberculosis than any other condition. But although they may occasionally be associated with a tuberculous infection, they do not predispose to that disease, and usually run a separate and parallel course. The damage is a sequel to an acute infection which may have become extinct, but more often persists, continuing to irritate and cause more damage, so that we have to deal with a progressive disease. Although, doubtless, many infections may lead to fibrosis, in my opinion the commonest cause is infection with the influenza bacillus. Chronic influenzal fibrosis not only forms the largest group, but in its typical form presents distinct features by which it can be recognised clinically, and separated from fibroses of other origin.

Cases of fibrosis of the lung fall naturally into two groups: (1) those arising in childhood, and (2) those arising in adult life. The former group has long been recognised. They begin usually within the first six years of life, and follow an attack of broncho-pneumonia, either simple or associated with whooping-cough or measles, or they may follow repeated attacks of bronchitis.

A typical case is that of a child of 8 or 9, who is brought with the complaint that he has had a cough and has not been really well since he had broncho-pneumonia at the age of 4. The cough tends to occur in paroxysms, and is at its worst in the morning on waking, when it may persist for half an hour or more and leave the child exhausted. Sometimes vomiting occurs in the paroxysms. Slight exertion, excitement, or talking may also bring on the cough. It is always worse in the winter, but may persist through the summer. Sputum is scanty, viscid, and hard to bring up, unless there is bronchial dilatation, when it is more abundant. Occasionally there may be blood in it. On examination there is diminished expansion and some flattening of the lower part of the chest on one side. There is some alteration of resonance, varying with the amount of fibrosis and thickened pleura. Breath sounds are diminished, but may be bronchial or cavernous when there is bronchiectasis. Numerous râles are heard over the affected area, and perhaps a few at the base of the opposite lung. Tonsils and adenoids have probably already been removed, but the child may still be a mouth-breather, and muco-pus can be seen in the nasopharynx. The general health is less impaired than might be expected from the condition of the lung, but the child is pale and a little under the average height and weight. At more or less frequent intervals there are exacerbations with a rise of temperature, and an increase in symptoms and signs. Râles become more numerous, and may lead to a diagnosis of broncho-pneumonia, but the condition is one of increased catarrh in a fibroid lung. Slight cases may become stationary or even lose their signs, and the children grow up well, and able to live normal lives, but very often signs persist; the disease slowly

* A post-graduate lecture given at the General Hospital, Birmingham.

progresses, the children are frequently unwell and have long periods of absence from school; well-marked signs of bronchiectasis develop with more abundant sputum, dyspnœa, and clubbing of the fingers. Life then becomes precarious, although they may struggle on to early adult life or even middle age.

It is, however, to the second group, those arising in adult life, that I wish especially to call attention, as the importance and frequency of the condition are not yet fully recognised. It is in this group that the ætiological significance of the influenza bacillus becomes prominent. For this paper I have looked through the notes of 100 adult patients, mostly seen during the last three years, in all of whom signs of fibrosis of the lung were associated with the presence of influenza bacilli in the sputum. Whether or no Pfeiffer's bacillus is the cause of epidemic influenza, it is certainly the commonest associate of this disease, is responsible for some of its peculiar features, and is a very persistent inhabitant of the damaged lungs so often seen as sequelæ. The bacteriology of the broncho-pneumonias of childhood and their sequelæ requires more investigation, but the influenza bacillus is frequently found in both the primary and secondary broncho-pneumonias, and fibrosis appears to be more frequent when this bacillus is present.

Ætiology.

Chronic influenzal fibrosis occurs equally in the sexes. Fifty-three cases were males and 47 females. It is found at all ages, but is most commonly seen between the ages of 30 and 55, 69 cases being within these limits. This refers to the ages when first seen by me and not to the age of onset, which was usually a few years earlier. These ages correspond with the fact that influenza in epidemic form has been particularly a disease of early adult life, and that we are now seeing the scars left by the epidemic of 1918 and subsequent years. Fibrosis seems less common during the 'teens, so that there is a gap between the fibroses of childhood and those of adults. This is partly bridged by cases produced in childhood and carried over into adult life.

The important point in the history of these cases is that, with few exceptions, patients could definitely trace back their trouble to some acute respiratory infection, and in at least 80 per cent. this event occurred in adult life. "I was quite well until I had influenzal pneumonia in 1918, and since then I have never been free from a cough." "I had influenza five years ago and have had several attacks since; these attacks are getting more severe, and I am away from business several weeks in the year." "I have had coughs and colds all my life, but they have been much worse since the influenza epidemic." "I had whooping-cough three years ago, when my child had it, and I have not been well since." These are typical histories.

In 25 cases there was a history of influenzal broncho-pneumonia; in 12 during the epidemic of 1918–19, and in the others during subsequent minor epidemics. In 17 others there was a history of severe influenza during epidemics. Twenty-one dated the onset back to a severe cold with bronchitis, not definitely called "influenzal," though associated facts suggest that some, if not all, of these were influenzal infections. Eleven had suffered from bronchitis for years with repeated acute attacks. Five traced their illness back to whooping-cough in childhood, and one to whooping-cough three years before. One had pneumonia after measles, and one after scarlet fever in childhood. Six had had coughs and colds as long as they could remember, but had been much worse the last few years. One was gassed in the war, and in seven the first onset was with asthma. In four only was the onset insidious, and no definite time could be stated when the cough began.

Bacteriology.

In all these cases the influenza bacillus was grown from the sputum and in the majority it was also found in cultures from the nasopharynx. The growth was abundant but never pure. The commonest associated organisms were streptococci and *M. catarrhalis* in 94 and 70 per cent. respectively. The pneumococcus was only found in 24, which seems surprising when we remember the frequency with which it is found in acute diseases. Fibrosis, however, is rare after lobar pneumonia, which is a pure pneumococcal infection, and true lobar pneumonia has been infrequent in recent years as compared with the pneumonias caused by mixed infections. It would seem that the pneumococcus is not a very persistent organism in the lower respiratory tract. Friedländer's bacillus, *Micrococcus paratetragenus*, diphtheroids, and staphylococci were also found occasionally.

The influenza bacillus is not only a very persistent organism in the lung, but is very often found also in chronic infections of the nasal sinuses, so that in many cases there is a widespread infection of the whole respiratory tract. We do not know much about the frequency of infection with the influenza bacillus in inter-epidemic periods prior to 1918, but Pfeiffer in 1893 recognised that the influenza bacillus could exist for long periods in the sputum and that there were chronic forms of the disease. Ortner in 1902 found the bacillus in cases of chronic bronchitis, and since Lord's papers in 1902 and 1905 occasional articles on chronic influenza have appeared in American medical literature.

Symptoms and Signs.

On examination all the cases showed some signs of fibrosis of the lungs, varying from slight signs at one or both bases to a widespread bronchiolectasis or a massive fibrosis of one lobe or the whole of a lung. The physical signs naturally vary from case to case, but in an individual case they are remarkably persistent and, except during exacerbations, show little change.

The cases can roughly be classified into five groups for the convenience of description.

1. *Chronic Bronchiolectasis.*—This is the most characteristic and severe form. It is illustrated by the following cases:—

CASE 1.—A matron-in-chief of one of the army areas in France had influenzal broncho-pneumonia in January, 1917, and was seen by me in the following May. She then complained of great weakness and of becoming exhausted on slight effort. She had only a slight cough. She had lost weight from 8 st. 4 lb. to 6 st. 4 lb. during her illness, but had since gained and was 8 st. 7 lb. She looked thin and pale. The chest showed poor expansion and impaired resonance, especially over the upper lobes, but the striking sign was the presence of medium-sized moist râles over the whole of both lungs. The diagnosis of tuberculosis had been made, but tubercle bacilli had not been found in the sputum, and with tuberculosis of the extent shown by the physical signs a patient could not walk about and be free from fever. The signs were those of a general bronchiolectasis and the sputum contained large numbers of influenza bacilli. She had prolonged treatment with an autogenous vaccine, rest and change of air, and in February, 1918, her general condition had improved sufficiently to return to duty in France, although physical signs were little altered. She developed sciatica a year later and was finally invalided in April, 1919. The physical signs continued with little change until she died in November, 1924, after a long period of increasing dyspnœa.

CASE 2.—A woman, aged 39, consulted me for rheumatoid arthritis, which began after an attack of influenza six months before. The joints showed typical rheumatoid changes. There was no complaint of a cough, but she was slightly cyanosed and dyspnœic. All over both upper lobes were the same medium-sized moist râles. The sputum, which was scanty, contained numerous influenza bacilli with streptococci. She was under observation for three and a half years, but, whilst the joints improved, the signs in the lungs persisted unchanged, breathlessness gradually increased, and she died from heart failure during an acute exacerbation.

Such cases, in my experience, were rarely seen prior to 1918, and every case of general bronchiolectasis I have seen since that date has been associated with the influenza bacillus. The physical signs are very characteristic and even startling: abundant medium-sized moist râles heard over the whole or the greater part of both lungs of a patient who, whilst distinctly unwell, is yet able to walk about. I have several times made the diagnosis of influenzal bronchiolectasis from

the physical signs alone, and this has been confirmed by the sputum examination.

2. *Localised Bronchitis.*—This is really a slighter form of the first variety. Over some area of the lung, more often in a lower lobe than an upper, are constantly heard râles, fine or medium, crackling or bubbling, with some rhonchi. At times rhonchi may be heard all over the lungs from a general bronchitis, but when this subsides râles still persist over a definite area. X ray examination will show increased lung striæ spreading from the root towards the damaged area. The condition is one of fibrosis with some dilatation of the smaller tubes forming a chronic focus of infection which in acute exacerbations spreads to the rest of the lungs. Frequently there are other chronic foci of infection in the nose and throat.

3. These cases may in addition have *asthma*. In seven of my cases the first complaint was of asthma, and in eight others it became a prominent symptom later. The physical signs are like those of the previous group—localised râles in some portion of the lungs with sibilant rhonchi during asthmatic attacks. In between attacks the râles persist. Nasopharyngeal infection is almost invariably present.

4. *Massive fibrosis* is a less usual condition.

CASE 3.—A man, aged 45, was seen last February. He had influenza in 1923 and since then cough and sputum had been gradually increasing in amount and he had become very dyspnœic. He was regarded as asthmatic, but the dyspnœa was both inspiratory and expiratory. Breathing was noisy and almost stridulous. It was apparent that there was some gross obstruction to his bronchi, although at times there was probably some added spasm. At first the noisy breathing occurred only during sleep, but latterly it was present day and night, but varied in intensity from time to time. The sputum, which was not abundant, contained large numbers of influenza bacilli. There was lessened expansion of the left side of the chest; breath sounds were harsh with prolonged expiration. Râles were heard all over the left lung, especially at the base, and there were râles also at the base of the right lung. X rays showed a dense shadow at the root of the left lung with much striation throughout that lung and to a less extent in the right lung. He has improved under treatment and though still dyspnœic has lost the noisy breathing.

CASE 4.—A man of 50, tall, well built, and of not unhealthy appearance, has had a morning cough and sputum since an acute illness in 1917. From the history it is probable that this was influenza. There have been occasional febrile attacks with increase of cough and for the last four months he has complained of feeling unwell. The left side of the chest shows deficient expansion, the apex beat is in the axillary line, and the right lung has crossed beyond the sternum. The greater part of the left side is dull on percussion, with some resonance at the apex due to the trachea being drawn to the left. Breath sounds are bronchial at the apex from the same cause, but diminished or absent elsewhere. There are a few râles at the base. The sputum is usually viscid and scanty, but on several occasions there has been a profuse hæmoptysis. *B. influenzæ*, *M. catarrhalis*, and streptococci were isolated from his sputum. X rays showed a dense shadow over the whole of the left side of the chest with the mediastinum drawn to the left. Here thickened pleura appears to be associated with considerable fibrosis.

5. *Bronchiectasis*, of the text-book description, with abundant sputum, possibly foul-smelling, clubbing of the fingers, cyanosis, &c., is not often seen in these cases. It was present in four, but in each was of long duration and the history suggested that the fibrosis began in childhood. The influenza bacillus may have been a secondary invader.

Fibrosis in children is most common in the lower lobes and on the left side. In these adult cases there is not quite the same predilection for the bases. In 63 the changes were limited to the lower lobes, in 24 the upper lobes, and in 13 both upper and lower lobes. In 20 the right lung only was affected and in 19 the left lung only; in the remainder both lungs were affected to a varying extent; in 36 over limited areas at both bases, in 11 in both upper lobes, in 8 the whole of both lower lobes, in 1 small areas at both apices, and in 5 the condition was general in both lungs.

General Symptoms.

All the patients complained of fatigue and general weariness; they were often regarded as neurasthenic. Fits of depression were not infrequent and one patient committed suicide. Nearly all showed some signs of the effort syndrome, shortness of breath on slight exertion, palpitation, pain around the heart, and a quick pulse. The temperature was normal except during acute exacerbations. In women an exaggeration of the premenstrual wave was commonly seen. Patients were often under weight, but not strikingly so, and in a few cases, especially in women about the climacteric, there was obesity. As in other chronic infections thyroid disturbances were sometimes seen. In the younger patients this was in the direction of hyperthyroidism and in one there was well-marked Graves's disease which began after an attack of influenza. Slight hypothyroidism was sometimes seen in the older women. Paræsthesiæ, tingling and numbness in the hands and feet, cold and blue extremities, fibrositic pains, neuritis, and occasionally arthritis were all sometimes present. There appeared to be an abnormal reaction of the capillaries to cold and a consequent proneness to rheumatic disorders.

I have already called attention to the frequency of associated infection of the nose and throat. Chronic sinus infection, enlarged tonsils, polypi, and nasopharyngeal catarrh are recorded over and over again. My impression is that patients with a pre-existing unhealthy condition of the nose and throat are more prone to suffer from chronic infection of the lungs after broncho-pneumonia than normal patients, and this is especially so in children, but frequently the onset of the nasal infection is coincident with that of the lungs.

An appreciable hæmorrhage occurred in seven, and in three this was at times alarming. Small streaks and clots in the sputum were frequently seen. The hæmoptysis naturally gave rise to fears of tuberculosis. It is not sufficiently realised that a large hæmorrhage may occur in non-tuberculous fibrosis. When hæmorrhage occurs with absent or scanty physical signs, tuberculosis is the most likely cause, but when extensive physical signs are present, especially at the base, fibrosis with bronchial dilatation must be considered as a possibility.

Pathology.

So far I have not obtained a post-mortem examination in a case which I have studied during life, and the exact condition of the lungs must be inferred from the physical signs, the known lesions of influenza and our general knowledge of fibrosis following acute infections. In influenza the bronchioles are especially attacked, the alveoli being secondarily affected. The bronchioles become blocked with secretion and desquamated cells. The mucous membrane is destroyed and the bronchiolar wall infiltrated with inflammatory cells and exudate, so that it becomes greatly thickened and extends into the surrounding lung. The next step is organisation of the inflammatory tissue and fibrosis. Dilatation of the bronchioles may occur during the acute stage, or more gradually from the traction of new-formed peribronchial fibrous tissue. The final condition is one of peribronchial fibrosis with dilatation of varying extent. If the changes are slight and the infection becomes extinct the process may stop, but in the cases here under consideration the infection persists, fibrosis increases, and we have a progressive disease.

X ray examinations are very helpful. Whilst the physical signs are mainly those of catarrh, the X rays show the extent of permanent structural change. Although sometimes they show little, in spite of extensive physical signs, more often they reveal more extensive lesions than the physical signs suggested. The most common condition is an increase of the root shadows and of the striæ extending outwards from the roots. These extend particularly towards the base, but may go to an upper lobe or throughout the lung. The cardiophrenic angle may be obliterated, and the outline of the diaphragm be irregular and angular, presumably from the traction of adhesions. The normal reticular structure of the lung may be exaggerated or may have a honeycomb appearance. Occasionally there is general dimming from massive fibrosis or thickened pleura. Lipiodol injections have

furnished a means of determining more accurately the presence of bronchial dilatations.

Diagnosis.

The most important error in diagnosis is to mistake these cases for tuberculosis. Various statistics in recent years have shown that from 30 to 70 per cent. of cases diagnosed as tuberculous and sent to tuberculosis experts have proved to be non-tuberculous. Among these cases chronic influenzal fibrosis occupies a prominent place. The following points help in recognising the condition.

1. The history is of great importance. In tuberculosis the onset is usually insidious. In influenzal fibrosis the symptoms can be traced back to some acute illness. The history that the patient has not been well since an attack of broncho-pneumonia, influenza, or whooping-cough should at once lead to the suspicion that the disease is of a non-tuberculous nature. Influenza may, of course, stir up a latent tuberculosis, but this occurs less often than has been supposed. Confusion may also arise from mild attacks of fever due to tuberculous auto-inoculations being described as influenza.

2. Non-tuberculous cases usually show fair general health, in spite of signs in the lungs which, if they were due to tuberculosis, would be associated with considerable ill-health.

3. Tuberculosis has its sites of election, and in its progress follows a definite line of march. Influenzal fibrosis does not show the same tendency to spread to fresh areas of lung. The disease remains localised. Progress is marked by increased fibrosis or bronchial dilatation in the same area rather than a spread to other parts.

4. It is usually taught that tuberculous cavities are apical and bronchiectatic cavities basal, but this rule has many exceptions, and influenzal fibrosis quite commonly occurs in the upper lobes.

5. Repeated examinations of the sputum for tubercle bacilli must be made. If always negative the condition must be regarded as non-tuberculous, for we are not now dealing with cases simulating early tuberculosis, but with those showing well-marked signs in which tubercle bacilli would be found if present. The two diseases may, of course, be associated. In four of my cases both tuberculosis and influenza were present, but in each the tuberculosis was the primary condition, and influenza an added infection. I do not include here cases definitely tuberculous in which influenza bacilli are found as a secondary infection, but cases of fibrosis in which the diagnosis was in doubt. Systematic examination of the sputum should be made for influenza bacilli as well as for tubercle bacilli in all cases of chronic lung infection.

6. The characteristic physical sign in influenzal fibrosis is the medium-sized bubbling râle. In tuberculosis clicking and consonating râles are heard, but the distinction must not be pressed too far.

7. The X ray picture differs from that of tuberculosis. It may resemble that of so-called hilum phthisis, and, indeed, I consider that many cases described as hilum phthisis are in reality cases of non-tuberculous fibrosis. When massive fibrosis is present with considerable dullness, dense X ray shadows and hæmoptysis, the possibility of a malignant growth must be considered. Pain is an early symptom of malignant growth, and is absent with fibrosis. Dyspnœa is more marked and the general health more disturbed, but in some cases time alone will settle the diagnosis. The presence of influenza bacilli in the sputum is not conclusive, as there is some evidence that influenza predisposes to malignant growths of the lung.

Bronchiectasis, bronchitis, and asthma may be component parts of the picture of influenzal fibrosis, and in all these cases the sputum must be examined for influenza bacilli.

Treatment.

Fibrous tissue once formed cannot be removed. The lung is permanently damaged. Treatment is therefore limited to attempts to improve the general health and to control the infection, with the object of preventing acute exacerbations, lessening cough and sputum, and impeding the progress of the disease. When patients can afford it, removal to a more equable, sunny climate will increase their comfort and prolong their lives. The nose and throat in many cases require efficient treatment to prevent foci of infection there from reinfecting the lungs. It is futile to expect improvement in the lungs when the upper respiratory tract is grossly infected. Treatment with autogenous vaccines is of great value, and I have seen considerable improvement after their use. In slight cases physical signs may disappear entirely. In more advanced cases the general health improves, cough and sputum become less, and exacerbations are controlled. As in other chronic infections the patient is "sensitised" and the initial dose of vaccine must be small, not exceeding one million. The dose is gradually increased, reactions being carefully avoided, and the treatment may have to be continued for 6 to 12 months. In spite of treatment the infection persists in many cases; the patients are "carriers," as is only to be expected in view of the permanent structural changes. In such cases relapses are likely to occur, and it is therefore wise to give a few prophylactic injections of vaccine each autumn and spring.

So far little attention has been paid to the prevention of fibrosis following acute infections. We do not know how long a broncho-pneumonia can remain unresolved and yet the lungs eventually return to normal, or at what stage the diagnosis of unresolved pneumonia must be changed for that of fibrosis. My own impression, after numerous X ray examinations, is that most cases of unresolved pneumonia are left with some permanent structural change, although there may be no symptoms and no catarrhal signs for long periods. It is necessary to make sure in every case of broncho-pneumonia that the condition has entirely cleared up before the patient passes from our care. If, after the temperature has fallen, the physical signs are slow in clearing up, efficient vaccine treatment, combined with such general measures as graduated rest, open air, the avoidance of fatigue, &c., would prevent many lungs from being permanently injured. We should be as anxious about the lung after acute diseases as we are about the heart in acute rheumatism.

Clinical and Laboratory Notes.

A CASE OF SPONTANEOUS PNEUMOTHORAX TREATED BY GAS REPLACEMENT.

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THE following case is of interest in showing the excellent results that may follow gas replacement in spontaneous pneumothorax:—

The patient, a grocer's assistant, male, aged 19, was admitted to the Winsley Sanatorium on June 17th, 1927. He had influenza last February and cough persisted. On June 4th he had a hæmoptysis of about half a pint. His mother has consumption with laryngeal involvement but has reacted very well to treatment at home, thus showing a good family resistance, which we thought to be in the patient's favour.

Condition on Admission.—General health poor; anæmic and rather hoarse. The physical signs in his chest showed involvement of both lobes of the left lung with moist sounds more numerous in the lower lobe. Pulse-rate, 88 morning, 96 evening; respirations, 20 morning, 20 evening. Bowels opened regularly, sputum ʒii. in 24 hours; T.B. +.

Progress.—For the first 18 days he ran a somewhat irregular temperature, never rising above 100° F. (oral), but this then subsided and he was allowed out of bed and put on graduated walks—namely, half an hour in the morning and afternoon. The laryngeal condition was treated by allowing "whispers only."

Onset of Spontaneous Pneumothorax.—On July 24th, at 4.30 P.M., during an attack of coughing, the patient was seized with a sudden acute pain in the left chest together with dyspnœa and faintness; he had to be assisted to bed. His temperature rose to 100° F. that evening and varied from 99° F. to 100° F. until the evening of July 28th, when for three days it varied from 102° F. to 103·4° F. The pulse at the same time was 120–146, respirations 40–44. He suffered from severe fits of coughing, causing much pain in the left chest, and from dyspnœa and a feeling of tightness which varied considerably from time to time.

The physical signs in the chest were those of a spontaneous pneumothorax with fluid. The heart was pushed well over, the apex being at the right margin of the sternum. Breath sounds were weak or absent on the left side. The percussion note was tympanitic above but dull at the base. Hippocratic succussion and the bruit d'Airain were readily obtained and he suffered from severe dyspnœa.

Early Treatment.—The patient was kept at absolute rest in bed with ordinary treatment for fever. Morphia (gr. ¼) was given and the left chest bound with adhesive strapping.

Gas Replacement.—On July 29th, owing to an exacerbation of the dyspnœa and other symptoms, a gas replacement (air) was done at 11·45 A.M. On introducing a pneumothorax needle into the second intercostal space in front, the pressures stood at ±0, +10. A second needle was now introduced into the ninth space behind and 480 c.cm. of clear straw-coloured fluid were withdrawn. At the same time 300 c.cm. of air were introduced through the first needle. At the conclusion of the operation the pressures stood at ±0, +10.

Further Progress.—From that time the patient's condition steadily improved. On August 7th a refill was performed and 400 c.cm. of air were introduced, this time into the fifth space in the mid-axillary line. The pressures before and after were respectively −6, −1, and +3, +9.

On August 11th his morning temperature, pulse, and respirations were respectively 97° F., 88, 24, and in the evening 98·4° F., 100, 26, showing a very marked improvement in his condition. On the 17th, the temperature being still quite normal, he was again refilled, the readings being +3, +4 : 350 c.cm. +7, +12.

Another refill on the 22nd :	+3, +7 : 200 c.cm.	+7, +12.
„ „ the 29th :	+2, +6 : 200 c.cm.	+6, +10.
„ „ Sept. 5th :	+2, +6 : 350 c.cm.	+9, +14.

Now he has ʒii. sputum, bowels regular. Temperature, 97° F. morning, 98·2° F. evening; respirations, 20 morning, 22 evening; pulse, 86 morning, 104 evening.

The rationale of the treatment is to remove the fluid, which may become purulent with disastrous results, and at the same time to introduce sufficient air to prevent the intrapleural pressure falling to such a degree that the valvular opening in the lung reopens. With a negative or atmospheric pressure this might easily happen during a fit of coughing or any undue exertion. Reopening the communication between lung alveoli and pleural cavity of course greatly increases the risk of infection of the latter.

An interesting point in the technique is the decision as to what pressure to leave in the pleural cavity after the operation. In this case it was decided to leave the pressures the same as they were before removal of the fluid. This pressure presumably approximates to the pressure in the lung during a fit of coughing. Any pressure higher than this would cause unnecessary discomfort, and undue strain would be thrown on the other lung and on the heart. Any pressure lower than this would, as stated above, leave the patient open to the risk of re-establishment of the communication between lung and pleural cavity. The remarkable feature was the improvement in breathing, which was unexpected, considering that the pressures were left unaltered. The load on the diaphragm would, however, be reduced by the weight of 480 c.cm. of fluid, which would, of course, have been acting in addition to the pressure in the gas cavity. We are prepared, however, to believe that the operation had a great moral effect on the patient, as pure shock plays such a predominating rôle in the prognosis with spontaneous pneumothorax.

For the future it is proposed to treat the case as an ordinary artificial pneumothorax. One of the advantages of removing part of the fluid is that this hastens the absorption of the remaining fluid, as experience has shown. Once the fluid is all absorbed and the opening in the lung securely healed, the prognosis must become that of an ordinary artificial pneumothorax. Unfortunately, secure healing of the hole in the lung is difficult to attain.

The hazards of the operation are, in the first place, those inherent in ordinary artificial pneumothorax therapy, with an especial risk of infecting the fluid in the cavity. In the second place, there is the danger of letting the pressure fall too low and hence increasing the risk of infecting the cavity from within.

This patient was not X rayed on admission but the X ray now shows a good collapse and fluid up to the fourth rib. The throat, as so often occurs in pneumothorax cases, is gradually improving and his general all-round condition is quite satisfactory. Spontaneous pneumothorax is, no doubt, much commoner than we imagine (cf. one of the hypotheses of the pleural rings so frequently met with in ordinary X ray photographs), but is often probably of little but academic interest.

A CASE OF FOREIGN BODY INADVERTENTLY SWALLOWED.

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THE following case is worthy of note because a piece of razor blade was evacuated after traversing the whole alimentary canal with practically no untoward consequences.

On Sept. 1st, 1927, the patient, a man of 30, was admitted to Ham Green Hospital suffering from scarlet fever. He was well developed and, though certainly not mentally defective, was rather obtuse and disobedient. At 3 P.M. on Sept. 9th, while eating toffee, the patient swallowed a triangular piece of "safety-razor" blade, with a long side made by the cutting edge of the blade, and an acute angle making a sharp needle-like point.

The only immediate result was the expectoration of 2 oz. of blood, presumably from the mouth. The same evening a meal of cotton-wool and jam was administered, and the following morning (6 o'clock, Sept. 10th) a meal of thick oatmeal porridge. At 11 o'clock on the morning of the 10th an X ray photograph was taken. This photograph showed the blade almost halfway up the ascending colon, embedded centrally in its contents. By a curious coincidence another adventitious shadow cast in the left costal region led to further questioning, which elicited the information that some time previously a needle had penetrated his chest wall, and had not been recovered. At 2 P.M. on Sept. 11th 1½ oz. of castor oil were given and the patient was kept under close observation. The sequence of events then was:—Sept. 11th: Bowels open 5 P.M., one stool and small quantity of wool; bowels open 8.30 P.M., normal stool. 12th: Bowels open 4 A.M., major quantity of wool and stool; bowels open 6.30 A.M., passed blade in stool, darkish in colour, but otherwise unaltered.

It is interesting that the blade was not passed with the wool. The patient now (Sept. 20th) appears to be making favourable progress, and suitable measures have been adopted to prevent a repetition of the experiment.

I am indebted to Dr. B. A. Peters for his permission to record the incident.

A NOTE ON SCARLET FEVER OF TOXIC TYPE.

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THE text-books contain references to cases of scarlet fever of a fulminating character which rapidly produces death, sometimes before the rash has appeared. The symptoms are vomiting and diarrhœa, suggestive of the effects of an irritant poisoning. The reader is inclined to ask how such cases can be labelled as scarlet fever in the absence of the characteristic symptoms and signs of that disease; presumably the diagnosis has been made because other cases presenting the ordinary signs of scarlet fever have occurred in such a way as to suggest relationship

between the two illnesses. It is therefore of some importance to place on record occurrences which support the view that scarlet fever does occasionally produce the symptoms referred to, and cause death before the appearance of a rash. Here is such a case :—

On the evening of Sept. 12th, 1927, Dr. E. W. S. Hughes, of Halifax, was called to see a girl, 5 years of age, who had been taken suddenly ill during the day with much vomiting and diarrhœa. She was collapsed and semi-conscious. Next morning she died. Naturally Dr. Hughes suspected poisoning by food, but an inquiry into the dietary revealed nothing suspicious, except that shortly before becoming ill she had eaten an apple ; other apples from the same batch were therefore examined by the borough analyst but no arsenic was found. The coroner ordered a post-mortem examination, and the stomach and intestines were submitted to Dr. F. W. Eurich, of Bradford, for bacteriological examination, but he reported that there were no organisms present which would account for the child's symptoms.

The day after the girl died her brother was taken ill, and three days later he was admitted to the fever hospital suffering from scarlet fever, mild in type but definite in nature, and of normal course. Hearing of the earlier occurrence I was able to suggest to Dr. Hughes that the first case was one of toxic scarlet fever of fulminating character as described in the text-books but rarely seen ; this explanation of the death was given to the coroner and accepted.

It is impossible to prove any real relationship between the two illnesses, but the occurrence is regarded as worth recording.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF EPIDEMIOLOGY.

AT a meeting of this Section held on Oct. 28th Dr. S. MONCKTON COPEMAN, F.R.S., the President, in the chair, Dr. E. W. GOODALL read a paper on the

Epidemic Constitution.

In recent years, he said, there had been a revival of an old doctrine which had seemed to have died out of this country about the middle of the last century. It had never been seriously discussed at any of the Epidemiological Society's meetings, though reference was made to it by Inspector-General Robert Lawson, who was President of that body, in 1863 and again in 1874. Apparently Sir Thomas Watson adhered to it in 1871. Dr. F. T. Roberts, however, referred to it only to characterise it as a mere hypothesis. In 1884 Dr. J. S. Bristow brought it into his consideration of predisposing causes of diseases, and definitely rejected Sydenham's idea that the constitution was able to impress its characters on diseases concurrent with the principal epidemic disease. But he added that admittedly there was something remarkable about the way in which diseases—contagious, zymotic, simply inflammatory—became prevalent in a high degree over wide areas. Dr. Goodall said this was the last reference to the epidemic constitution which he could find in the literature of this country, but in France the idea seemed to have survived until the year 1896. Perhaps the chief cause for the decay of the doctrine in Britain was the growth of belief in the germ theory of infectious diseases, a subsidiary reason being that Government and official investigators did not favour it. Now, however, in the annual report of the chief medical officer of the Ministry of Health for 1925 there seemed to have been acceptance, in regard to influenza, of the "epidemic constitution" as a fact. In view of this it was of interest to inquire what was meant by the epidemic constitution. Hippocrates was said to have ascribed epidemics to something divine, as due to some unknown and inexplicable cause, but there seemed no good reason for attributing such a view to him. Among the natural causes of many diseases weather conditions were of the first importance. Hence arose the doctrine of the "constitution"—i.e., the doctrine of the season. In 1546 Fracastor provided another instrument for research into the causes of epidemics, when he clearly explained the modes by which infection could be spread. He applied the doctrine of contagion, the essence of which he believed to be a living organism, to explain certain diseases which were epidemic.

Sydenham divided the prevalent epidemic diseases into two groups: "the stationary," and the "intercurrent" or "sporadic" fevers. The former was the more important group. His intercurrent fevers were dependent upon more or less obvious causes, such as the temperature of the air, the rainfall, and the prevalence of certain winds. The stationary fevers depended upon "the epidemic constitution"—in other words, the constitution of the atmosphere. The duration of the stationary fever was said to be variable. Sydenham in his time recognised seven "constitutions"—those of the intermittent fevers, plague, small-pox, dysentery, comatose fever, depuratory fever, and continued fever. It seemed to the writer, however, impossible to find out exactly what Sydenham meant by the term "epidemic constitution"; it was a vague something over and above the more or less obvious causes of disease, whose presence was necessary before there could be an epidemic. For example, sporadic cases of plague might occur from time to time, but unless a pestilential constitution of the air arose there would be no epidemic of plague.

Dr. Goodall said he had had 40 years' experience of epidemic diseases—i.e., diseases in which the phenomenon should especially be manifest—and practically all of it had been in London, so that his experience had not been subject to the disturbing influences of change of locality. Among the cases admitted to the North-West London Hospital at Hampstead during the winter of 1924 and the following spring, influenza was the stationary fever of the period ; whooping-cough, scarlet fever, diphtheria, mumps, rubella, and chicken-pox were the intercurrents amongst the infectious diseases. He found no evidence whatever that these last-mentioned diseases bore any trace of influenza, and that had also been the experience of former years. He was not a believer in the doctrine of the epidemic constitution as set forth by Sydenham and the revivalists. He was prepared to substitute alternative teaching.

The first question which should be asked by those who took up the study of epidemiology was, Why were there epidemics at all ? He would answer that the epidemics were the expression of the warfare ever going on between human beings and animals on the one hand and micro-organisms on the other. If there were no micro-organisms there would be no epidemics of those diseases which had a microbic cause. The epidemiologist had to consider not only the human being and his surroundings, but also the micro-organisms and their surroundings. The genesis of an epidemic did not depend on one single cause, scarcely upon one outstanding cause aided by minor causes. Even the presence of micro-organisms was not necessarily the principal factor in the combination of events which brought about an epidemic. An epidemic was the result of the interplay of several factors, the kind and number of which varied for each disease. Serum sickness, for example, did not always attack the same proportion of those who were injected with the serum ; at one time nearly all the injected suffered from the sickness, while at another time most of them escaped. And the symptoms of this sickness varied from time to time too, for the rash was not the same in all collections of cases. These variations had now been found to be due partly to the ages of the patients who were treated with the serum, partly to the source of the serum (the animal from which it had been obtained), partly to the dosage, partly to whether or not it had been subjected to a special chemical treatment.

Dr. Peters had defined "epidemic potential" as being the head of power for epidemic spread present at any particular stage of the epidemic, as gauged by the intensity of the infectivity over the lowness of the susceptibility of the population. There was need for a term which would express the pre-epidemic phase. "Epidemic constitution" as a term in epidemiology should, he considered, be discontinued, as its use tended to conjure up in the mind a vague and mysterious phantom. He pleaded for the adoption of Dr. Peters's term "epidemic potential," giving to that the extended meaning suggested by Prof. Topley in his Milroy lectures of last year—namely, "the balance of interacting forces which tends towards the occurrence of an outbreak of disease."

Discussion.

Sir WILLIAM HAMER said it ought to be realised that there were three Sydenhams, representing different phases of his conception of various medical problems. It was the second Sydenham who took the world of medicine by storm. With regard to the attitude of the Ministry of Health, he asked Dr. Goodall to restudy the "setting" of that Ministry as indicated in its report for 1920. Sydenham's voice still spoke to the present generation, though his viewpoint was the antithesis of that held to-day. The task of his followers was to make those two opposites into a higher unity.

Prof. M. GREENWOOD said he felt much interest in Dr. Goodall's statement that the Ministry of Health had officially adopted the "epidemic constitution" in its C.M.O.'s report for 1925. But the only reference he could find in it to justify this allegation was the following: "As far as the 'epidemic constitution' of influenza is concerned, which has played so large a part in our records of mortality since 1889, there is little to be said"—surely a very chary adoption of the doctrine. The phrase "epidemic constitution" was, Prof. Greenwood considered, a very unfortunate one, and it would be a great advantage if it could be excluded from epidemiology. In regard to Sydenham's theoretical teaching, the speaker supported what Dr. Goodall said in the paper, as he had never been able to understand what Sydenham meant, and it was significant that though that authority made theoretical distinctions, he did not carry them into his treatment, for he used the same treatment for every constitution. In the views they had expressed, Hamer and his school were about 150 years ahead of their time; they were attempting to synthesise without the necessary information. What was needed was a study of epidemics on a smaller scale, of a succession of epidemiological phenomena in populations of animals which were shorter-lived than man; then knowledge so derived could perhaps be applied to successions of human epidemics.

Prof. W. W. C. TOPLEY expressed his general agreement with Dr. Goodall's views, and as to the great value of such descriptions as Sir William Hamer had given of the succession of diseases. At present the data available for a study of such problems did not enable one to go very far.

Dr. J. D. ROLLESTON remarked that the Plague of Athens, in his view, more nearly resembled typhus than any other disease. Thucydides said that the year of the plague was singularly free from all other diseases, and added that whatsoever diseases there were became converted into it. In connexion with such a recent epidemic as that of diphtheria in Paris in 1926–27, the French spoke of a constitutional tendency accounting for the intensity of the disease at that time. With regard to serum disease, cases of this were less frequent since the introduction of refined serum. This disease was best studied in connexion with diphtheria, owing to the universal treatment of it by serum. The more severe the attack of diphtheria, the less likely was serum disease to occur. And some parallel to this was seen in the case of small-pox.

MEDICO-LEGAL SOCIETY.

RECENT ADVANCES IN TOXICOLOGY AND FORENSIC MEDICINE.

Sir WILLIAM WILLCOX chose this subject for his presidential address to the Medico-Legal Society on Oct. 27th. Since its foundation in 1902, he said, the Society had served a useful purpose in discussing and criticising medico-legal discoveries, and such criticism was essential, because there must on no account be any risk of inaccuracy in the results attained by scientific tests used in legal investigations. Such tests must be without flaw. He then proceeded to consider some of the ways in which toxicology assisted the law.

Arsenic.—One of the greatest recent advances in the toxicology of arsenic had been the introduction of the electrolytic Marsh test by Prof. Thorpe in 1903. The detection of minute amounts of arsenic in the urine had enabled the rate of excretion of arsenic to be accurately determined; the detection and estimation of minute quantities in the hair and nails were also often of forensic value. Thus in the Armstrong case arsenic would have never been suspected as the cause of the death of Mrs. Armstrong (who had died about a year previously) if Major Armstrong had not attempted to poison his rival solicitor, Mr. Martin, by the same means. The discovery of arsenic as the cause of Mr. Martin's illness was due to Mr. John Webster's analysis of the urine passed by Mr. Martin three days after the poison had been taken. The advantage of toxicological research was here beautifull illustrated, for the knowledge of the rate at which arsenic was excreted made it possible to deduce that Mr. Martin must have been given a fatal dose.

A Government official in a tropical country consulted Sir William Willcox on account of an illness which had given rise to much difficulty of diagnosis. On Oct. 6th, 1922, he was attacked with severe abdominal pain, vomiting, and diarrhœa, watery stools containing some mucus being passed. He was very ill with these symptoms for three days and had a good deal of hiccup. On Oct. 9th circumoral herpes developed. The patient remained in hospital until the 30th, when he returned to duty. He now began to suffer from slight cramps in the feet, some numbness and feeling of coldness in the hands and feet, and some weakness of the legs. Marked thickening of the skin of palms and soles occurred, and the skin peeled off here in the middle of November. In consequence of these symptoms the patient came home in November. On Dec. 19th, 1922, slight anæsthesia to a light touch was found in the hands and feet, and there was some thickening of the skin of the palms and soles. The patient consented to some of his hair being removed for purposes of analysis, and Dr. Roche Lynch submitted this to the electrolytic Marsh Berzelius test. A considerable amount of arsenic was found in the hair, 1/22nd mg. in 3 g. of the hair. The diagnosis in this case was clearly that of acute arsenical poisoning on Oct. 6th, 1922, and on question it was found that the patient had had considerable trouble on that date, on account of the misbehaviour of his native cook, who was discharged from service on the following day.

This case was of great interest, said the President, since knowledge of the mode of excretion of arsenic made it possible to diagnose acute arsenical poisoning as long as ten weeks after the poison had been administered.

Arsenobenzol Compounds.—Prof. Paul Ehrlich had discovered salvarsan in 1910 and neosalvarsan in 1912. Since then innumerable arsenobenzol derivatives had been introduced, but none of them, he thought, had proved more efficacious than the original salvarsan, though many were easier to administer. Ehrlich's discovery was one of the greatest therapeutic advances of modern times. Sometimes, however, the drugs acted as severe liver poisons, and occasionally they had even produced complete suppression of hepatic function. The close relationship between toxicology and medicine was well illustrated in the fact that the occurrence of these toxic effects led to the discovery and use of tests for determining liver function.

Liver Poisons.—Knowledge of these poisons had been greatly increased during the war. The use of tetrachlorethane as one of the constituents of a cellulose solvent for the varnish used on aeroplane wings had led in 1914 to the occurrence of a large number of cases of toxic jaundice. These had been first investigated by Sir Bernard Spilsbury and the speaker, and extensive degeneration of the liver had been found in fatal cases. A harmless substitute (amyl acetate) had eventually been discovered. Trinitrotoluene was also found to cause severe and often fatal toxic jaundice in addition to other effects such as dermatitis and anæmia. Dinitrobenzene, dinitrophenol, and picric acid gave rise to similar effects. The study of the toxicology of the liver poisons met with during the war had undoubtedly thrown much valuable light on our knowledge of the pathology of hepatic diseases in general. The characteristic feature of these poisons was that they produced degeneration and destruction of the hepatic cells resulting in a replacement fibrosis in the liver when recovery from the immediate effects of the poison occurred. "I have at the present time under my care at St. Mary's Hospital," said Sir William Willcox, "a patient suffering from ascites, the direct result of a cirrhosis of the liver caused by trinitrotoluene poisoning contracted in a munition factory in 1916, at which time an attack of acute toxic jaundice occurred."

Alkaloidal Tests and Methods of Detection.—The somewhat complicated processes of extraction described by Stas and improved upon by Otto and Dragendorff were still in use. The tendency of modern work had been to simplify them, and the late Sir Thomas Stevenson had introduced a practical modification of the Stas process. The great importance of carrying out all alkaloidal extractions at temperatures not exceeding blood heat was now fully realised. It was by using the utmost care in this respect in the Crippen case that hyoscine had been successfully extracted from viscera which had been buried for six months. The application of micro-chemical methods in the testing of alkaloidal extracts enabled minute amounts to be detected. For example, in the doping of horses, it was possible to obtain the alkaloid from the saliva obtained by placing a clean sponge in the horse's mouth.

The *lead treatment* for cancer, introduced by Prof. Blair Bell, was an example of the use of a powerful poison just within the limits of its toxic action. Much light had been thrown on the toxicology of lead by its use in this manner, and it was of interest to note that the effects of intravenous injections under proper control differed considerably from those of chronic lead poisoning. In the latter the cardio-vascular system, kidneys, and nervous system generally suffered much damage, whereas this was not specially noticeable in the treatment of cancer by intravenous lead.

New Drugs.—After referring to tobacco and alcohol, Sir William Willcox turned to the consideration of new drugs. There was a tendency at the present day, he said, to select for use new and vaunted drugs of foreign manufacture. Unfortunately these were often allowed to supersede the old and well-tried remedies. The English market was flooded with all kinds of hypnotic drugs of foreign manufacture which were advertised as harmless and free from dangerous toxic effects and from the risk of addiction. From 1905 to 1925 upwards of 257 cases of fatal poisoning had occurred from the barbituric acid group of drugs (veronal, dial, medinal, luminal, allonal, veramon, &c.), and there seemed to be no sign of diminution in these tragic occurrences. Numerous cases of addiction had been reported. It could not be too strongly emphasised that new organic drugs of hypnotic action should be used with great care and caution, and statements as to their harmless nature should not be accepted at their face value. New organic compounds should also be used with care, and it should be remembered that they had in all probability a definite action on the liver and nervous system which might have toxic effects. For example, the quinoline derivatives (atophan, &c.), which were of value as uric acid eliminants, might give rise to serious hepatic disturbance. He was informed on good authority that fine chemicals and proprietary remedies were imported into this country in enormous quantities from abroad, with little restriction as regards duty, whereas similar products of British manufacture were subjected to such hampering restrictions and duties as rendered their exportation impossible.

Other Potential Poisons.—Sir William Willcox went on to speak of the toxic effects of thallium acetate, carbon monoxide, and such physiological substances as pituitary extract and insulin, whose detection, for forensic purposes, might present some difficulty. The chemistry and toxicology of bacterial toxins was, he said, a field almost entirely unexplored. Aconitine (minimum fatal dose gr. 1/30th) was one of the most deadly of the vegetable alkaloidal poisons, but compared with some of the bacterial toxins its poisonous properties sank into insignificance. Thus a therapeutic dose of tuberculin was gr. 1/10,000,000, and the toxins of other organisms are probably much more potent.

Blood Stains.—Great advances had recently been made in the examination and detection of blood stains. The chemical, microscopic, and spectroscopic tests had been improved so that by micro-chemical methods the full tests could be carried out on a minute stain. These tests, however, only made it possible to say that the stain was blood, mammalian or otherwise. Uhlenhuth, Nuttall, and others (1902–05) had discovered and applied the precipitin test by which it was possible to determine the species of animal from which the blood was derived. The precipitin test for blood had been used by the Home Office scientific analysts since 1908, and had proved of great value. Since then it had become possible to say from the examination of a stain from what human group the blood was derived. Blood grouping had already been applied in a medico-legal case in this country by Dr. Walker Hill, and might even be used in cases of alleged paternity.

Wounds.—Sir Bernard Spilsbury's Lettsomian lectures (1925) on Wounds and other Injuries in their Medico-legal Aspect gave an admirable account of the advances made in this direction. Wounds from firearms had received great attention recently, and it had been found that the rifling and marks inside the barrel of a pistol left a definite impression on the bullet fired. By this means it was often possible to say whether a discharged bullet had or had not been fired from a particular pistol. On this subject Prof. Sydney Smith, of Cairo, had done valuable research.

Ultra-violet rays in forensic investigations promised to be of great value. The fluorescing properties of certain substances often served for their immediate identification; thus difference in the composition of sealing-waxes was often at once shown when viewed under ultra-violet light. Kinds of paper which appeared similar under ordinary light were often seen to be different under ultra-violet light.

In conclusion, said Sir William Willcox, it should be remembered that toxicology and forensic medicine were really part of general medicine and intimately interwoven with it. They should not be kept in watertight compartments, and too great a differentiation was retrograde.

BOSCOMBE HOSPITAL EXTENSION.—The Prince of Wales recently visited Boscombe Hospital. In the newly opened extension he named the men's ward after himself, and congratulated Dr. C. H. Vernon, of the medical staff, who won the King's prize at Bisley this year. The extensions provide 50 beds for men and 50 for women.

ABERGELE SANATORIUM.—The Ministry of Health has intimated to the Public Health Committee of Manchester its approval of the extension of the Abergele Tuberculosis Hospital; the new block will accommodate 210 children, and will cost £134,000. This extension is part of a larger scheme which will ultimately provide 520 beds.

INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY.

ANNUAL CONGRESS AT ROME, OCT. 12TH–16TH, 1927.

Prof. Umberto Gabbi, of the University of Parma, presided over the Congress this year, at which 14 nationalities were represented, with an attendance of 250 members and friends. The first three days, during which the Congress met in Rome, were divided between scientific business, public functions, and sight-seeing. At the outset an address of welcome was read in the Campidoglio by S. E. Pietro Fedele, Minister of Public Instruction, who was supported by Prince Potenziani, the Governor of Rome, the Dean of the Faculty of Medicine, and the Director-General of Public Health. Later in the day the members were received at the Palazzo Chigi by Signor Mussolini, and on the following day there was a reception at the Chamber of Deputies.

In the first discussion on the Use of Water in Acute Disease, Prof. GABBI (Parma) described his work on the nature of fever, which had led him to the conclusion that it must be considered rather in the nature of a grave danger to the organism than as nature's method of cure. He accordingly advocates hydrotherapy in preference to antipyretic drugs. Prof. ALOIS STRASSER (Vienna) dealt with the physiological and pathological principles underlying hydrotherapy, and described his attempts to estimate its value in promoting the excretion of toxins. While this rôle of the skin may have been overrated in the past, he regards the action of the skin on the immunobiological apparatus of the blood and hæmatopoietic system as a desirable field for research. Dr. FORTESCUE FOX (London) discussed and tabulated the acute conditions in which hydrotherapy is of proved value, referring in each case to the suitable technique. He divided the diseases he referred to into the acute febrile and acute *non*-febrile diseases, including in the latter category hæmorrhage into the stomach, brain or lung, migraine, Ménière's disease, and hyperthyroidism. Dr. C. E. SUNDELL (London) referred to the theory and technique of the "pyretic" treatment of acute rheumatism, basing his procedure on the assumption that acute rheumatism is not a "specific" disease in the sense that pneumonia and enteric fever are. A spirited discussion followed. Later, Prof. ASCOLI (Faculty of Medicine, Rome) read a paper on the baths of old Rome.

Members of the Congress were taken by special train to Montecatini, a watering-place situated between Florence and Pisa, well known formerly to English visitors, where they were received by Prof. QUEIROLO (Pisa), the honorary bath director. Papers were read on the biological action and therapeutic indications for thermo-mineral baths. Prof. VALENTI (Milan) considered that no single theory can account for the action of the various waters, since it is probable, he thinks, that the colloidal content may exert a fermentative action, whilst the absorption of gases, the contact action of saline particles and consequent ionic charges, have all to be taken into account. Prof. MARFORI (Naples) next spoke on the relation between the physico-chemical characters of various waters and their biological effect; this he has studied extensively in rabbits and dogs, finding certain constant modifications in the blood which depend on the tonicity of the saline employed. Dr. J. B. BURT (Buxton) gave an interesting paper on the differences between the action of thermal mineral waters and that of the simple hot bath, showing how the reactions differ in three essential characteristics—therapeutic effect, "bath reaction," and thermal debility. He discussed the causes for the differences observed, and put forward a plea for radio-activity as a possible explanation. He stressed the therapeutic importance of the skin, which, as he said, regulates the relations of the body with the outside world. He also compared the action of radio-active thermal waters with that of the ultra-violet rays.

On the next day the discussion was continued, and a paper was read by Prof. CHASSEVANT (Algiers) on the Electrical Phenomena of Medicinal Waters. He said that a medicinal water consists in a complex material held in a dispersing medium. The dissolved and suspended elements can be isolated and analysed, but their actual state can only be determined by estimating their physical conditions, amongst which electrical phenomena are pre-eminent. These methods render it possible to prepare a scale of ionisation, which is of considerable value in estimating the therapeutic activity of mineral waters. Mr. JOSEPH RACE (Buxton) discussed electrical phenomena under four headings—those of electrical conductivity, colloidal charge, hydrogen-ion concentration, and radio-activity. He explained the importance of each, and gave the results of recent attempts made in Buxton in connexion with the conservation of radio-activity in water. Dr. JUDD LEWIS (London and Tübingen) then put forward certain proposals in connexion with the adoption of international standards of measurement. He pleaded for agreement as to the manner of determining and expressing experimental data and for the presentation of these data to the physician in an acceptable and easily applicable form—e.g., the expression of the mineral content of a water as grains per 100 c.cm., this amount being equivalent to about half a tumblerful, and therefore a practical measurement from the point of view of the physician. A special committee was appointed by the society to deal with the matter more fully. The next paper, by Dr. PAUL FERREY-ROLLES (La Bourboule), dealt with the antitoxic and anaphylactic phenomena observed in connexion with medicinal waters. He showed that the natural immunity of animals may be raised, and quoted the belief of Billard that "every poison of organic origin can be rendered inactive by some water."

The final meeting-place of the Congress was Salsomaggiore, near Parma. Here the waters are subjected to several "processes" prior to being delivered to the baths, in contravention of the dictum of a distinguished hydrologist to the effect: "Mineral water, to be efficacious therapeutically, must be used in the state in which it leaves the earth, without being in any way modified chemically, and with as little difference in temperature as is possible." In Salsomaggiore salt is extracted on a commercial scale, as is iodine, whilst the petroleum content of the water, which is removed at the well-mouth, is sufficient to light the town. Prof. ZOIA (Milan), who opened the proceedings, gave, however, some striking instances of the beneficial effects of these waters in cases of chronic inflammation with exudation, in which he was borne out by the PRESIDENT. In particular he referred to the use of the dry salt inhalation, a method which is in advance of the ordinary vapour inhalation, and which is not used in England. In the afternoon a paper was read by Dr. A. MOUGEOT (Royat) on the action of waters on ferments and micro-organisms, during the course of which he showed that many medicinal waters were capable of sustaining the life of isolated cells, the cells chiefly used being red blood cells and spermatozoa, whilst sulphur water can be shown to have a marked bactericidal effect. The secretion of soluble ferments, which is a function of all cells, may be stimulated or inhibited by waters, whilst bicarbonate and sulphur waters have both a direct and indirect zymosthenic action for amylases and oxydases. This zymosthenic property is attributed to the electrolytes in the various waters. Mr. ARNOLD WOODMANSEY (Harrogate) terminated the proceedings of the Congress with a paper on the same subject, in which he stated that three standard types of organism (*B. coli*, *Staphyloc. aureus*, *Strept. fæcalis*) were submitted to the action of Harrogate sulphur waters under standardised conditions of technique; the bactericidal action was evident in every case, but the rate varied with the strength of water employed. Iron water of various

strengths was also employed and appeared to have a tendency to selective action, the colon bacillus and staphylococcus being more affected than the streptococcus.

Several members of the Congress visited Parma, where they were shown round the University and new hospital, where the President, Prof. Gabbi, occupies the chair of clinical medicine.

JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH.

ON Oct. 18th Prof. JOHN FRASER (Edinburgh) read a paper on

Superficial Pain as an Aid in the Differential Diagnosis of Abdominal Pain.

After alluding to the difficulty of accurately diagnosing many abdominal conditions, he pointed out that superficial pain in one or more of its manifestations might offer great assistance. He dealt particularly with two manifestations of superficial pain: (1) hyperalgesia or hyperæsthesia, and (2) referred pain. Hyperæsthesia and hyperalgesia were explained as depending upon an irritability of certain spinal areas, the irritability having arisen as the result of certain afferent abnormal stimuli transmitted from the deranged viscus. The reception of a second somatic afferent impulse from the superficies corresponding to the excited spinal segments was apt to be magnified or altered so as to be represented to the sensorium as a hyperalgesia or a hyperæsthesia. Prof. Fraser found the most striking manifestation of the sign in connexion with infection of the gall-bladder and with appendicitis, in which it had been found in 58 per cent. of cases. The distribution was remarkably constant—namely, over the area described as Sherren's triangle, the distribution of the tenth and eleventh dorsal nerves. A great variety of factors might explain the incidence of the sign, and there was evidence that the responsible stimulus arose early in the pathological sequence, and that it might consist of stimulation of the mucous surface of the affected organ. Some of the most distinctive records arose from cases in which there were threadworms and concretions in the appendix. In gall-bladder disease the sign was more likely to be associated with small mobile stones than with a single large fixed stone.

The explanation of referred pain commonly accepted, said Prof. Fraser, was the projection to the surface by a disturbed sensorium of stimuli originally recorded as afferent impulses from a disturbed viscus. Apparent referred pain was more constantly present than hyperalgesia and hyperæsthesia, but it was very difficult to distinguish true referred pain. The paper ended with a reference to the problem of local tenderness and the interpretation of muscular rigidity as a manifestation of underlying visceral disease.

MILK BY GLASS TANK.—The London Midland and Scottish Railway, in conjunction with a large wholesale milk firm, are bringing into use a glass-lined tank for the conveyance of milk. The tanks, fixed on steel undercarriages, are insulated against fluctuations in temperature, so that the milk will reach its destination in good condition. Each tank holds 3000 gallons, and does the work of three ordinary milk vans. Something like 100,000,000 gallons of milk are carried annually by the railway.

SHEFFIELD HOSPITALS.—During a visit to Sheffield last week in which he visited numerous Poor-law institutions, Mr. Chamberlain, the Minister of Health, opened the corporation's new maternity and child welfare centre and a new out-patient department at the Sheffield Royal Hospital. In his speech on the latter occasion he advocated closer coöperation between hospitals and the general practitioners who send patients to them. Last week also, Lord Cave, the Lord Chancellor, opened Norton Hall as an auxiliary of the Jessop Hospital, Sheffield.

Reviews and Notices of Books.

THEORY OF PERCEPTION.

An Introduction to the Theory of Perception. By Sir JOHN HERBERT PARSONS, C.B.E., D.Sc., F.R.C.S., F.R.S., Ophthalmic Surgeon, University College Hospital. Cambridge: University Press. 1927. Pp. 254. 18*s*.

ONE aim of the author is to bridge the gap between the neural and the psychological by considering the phenomena of perception. Ambitious as such an aim may appear, it is by no means either impracticable or elusive, for the reader is informed at the outset of the author's "creed"—viz., that the doctrine of emergent evolution, as set forth by Lloyd Morgan, provides the stepping-stones whereby to pass without discomfort or straining of effort from one stage to another over the general stream of vital activities. The postulate is to the effect that from the combinations of elements of a given series new things arise of a different order, not to be foreseen by contemplation only of the original constituents of the combinations. Applying the hypothesis to the problem before him, Sir John Parsons can discover no hiatus as between the emergence of life at a given stage in evolution from matter, and the emergence of consciousness still later. Indeed, his problem is facilitated by discussion of what exactly is implied in the terms "consciousness" and "perception." For, clearly, he is inclined to see in stimulation of the simple receptor mechanisms of the lowliest organism the emergence of a state of "awareness" of a change in the environment, and in the tingeing of this awareness with an affective and cognitive element, however minimal, the emergence of something comparable to a perceiving consciousness. Thus even at the level of reflex activity are introduced traces of the sentience and the conation of the animal who, advanced in the scale is admittedly furnished with mechanisms the functions of which are associated with processes commonly called psychical. Once such suppositions are accepted the way is smooth; from this germ of response to stimulus the final flower of ideation and conceptual consciousness springs and reaches maturity.

The general hypothesis thus outlined is supported by a wealth of data drawn from various fields of biological and neural activity and illustrated by apt comparisons. From it the author passes to a study of the afferent nervous system viewed directly and comparatively, in particular of the systems of common sensibility and of vision. This study is well done, although from the standpoint of neurology certain statements relied on by the author in support of his theory might be traversed. He evidently accepts evidence suggesting the existence of a dual sensory system, but his conception of it is that neither of Head nor of Foerster. He distinguishes a dyscritic or primitive stage of little differentiation and little discrimination from an epicritic stage which permits of differentiation; one system persists alongside the other in most of the senses even of the highest animals. Pain, however, according to Sir John Parsons, exhibits no duality, and its mechanisms are not represented in the cortex. Not a little clinical and other evidence might be advanced against the view that the thalamus is a *terminus ad quem* of the primitive sensory system, and that in no circumstances can pain experience be cortical.

Other considerable sections of the volume are concerned with what appear to be side-issues, for instance, investigation of posture and attitude, and morphological descriptions of the comparative anatomy of the midbrain and basal ganglia. The final sections, on the visual system, take the reader back to the main thesis of the book and are conspicuously lucid even if highly technical. Incidentally discussion ranges over a number of minor if cognate questions arising out of perception in still other of the sense fields.

NEUROLOGICAL SEMIOLOGY.

Sémiologie des Affections du Système Nerveux. By Prof. J. DEJERINE. Paris: Masson et Cie. 1926. With 560 illustrations, many in colour, and three plates. Pp. 1219. Fr.190.

THE classical treatise on neurological semiology by the late Prof. J. Dejerine, long out of print, is often asked for. The present edition is an exact replica of the issue of 1914, that fine expression of the author's genius and labours. Glancing through its familiar pages again, we note how little, comparatively speaking, calls for modification, and are impressed once more with the clinico-pathological method of the French school and with its patent advantages. Perhaps its chief disadvantage is that it is weak in regard to the physiological interpretation of clinical syndromes; it legitimately associated symptoms with lesions, yet it rather fails to explain how the former must arise through mechanisms that are in action, not destroyed. Dead mechanisms are functionless.

A new generation is arising in neurology, and we commend to their interest this superb production, which those who have known Dejerine consider the work of a master.

PATHOGENESIS OF THE NEUROSES.

Das Neurosenproblem, vom lebenswissenschaftlichen Standpunkt aus. By Dr. EDGAR LEYSER, Privatdozent for Psychiatry and Neurology, Giessen. Berlin: S. Karger. 1927. Pp. 64. M.3.20.

THIS is a readable little essay on the pathogenesis of the neuroses, considered in a biological framework. Sensations, feelings, and fantasies are psychical processes which can enter the field of consciousness; the latter two in particular, representing as they do the undercurrents of emotion, are largely responsible for neurosis-formation, since in certain circumstances they may lead to a conflict between inclination and duty. Neurotic symptoms are in reality the outward expression of clashing feelings, and their prognosis depends on the fate or outcome of the rivalry. Treatment will prove efficacious if it is devoted to developing new emotional combinations, to checking and counteracting the old, and to establishing other aims in life. Thus will the wounds resulting from an antagonism of feeling-trends be healed.

AN INTRODUCTION TO NEUROLOGY.

Fourth edition, thoroughly revised. By C. JUDSON HERRICK, Professor of Neurology in the University of Chicago. London and Philadelphia: W. B. Saunders Company. 1927. Pp. 406. 12*s.* 6*d.*

POSSIBLY no book comparable in subject and in dimensions contains so much of the pure meat of neurological doctrine as does this modestly entitled "Introduction," which we have reviewed on previous occasions with due appreciation of its admirable qualities. Elementary enough for the tyro, it nevertheless adroitly manages to lead him by easy stages into deeper water without his ever becoming conscious of being out of his depth. Few writers on technical subjects exhibit such a desirable combination of knowledge and of skill, or art—whichever it be. Prof. Judson Herrick draws on zoology, anatomy and comparative anatomy, physiology, comparative physiology and psychology, with equal ease and directness, to present to his reader the nervous system as a working mechanism, from the lowest levels of reflex action to the highest complexities of behaviour.

A scholarly handling of wide-ranging material and a philosophic interpretation of diverse data combine to render this "Introduction" outstanding. If the student works from it and learns its principles no less than its facts he will indeed have gone a long way towards a scientific and practical knowledge of the most important system of the human frame.

A SYNOPSIS OF SURGERY.

Eighth edition. By ERNEST W. HEY GROVES, M.S., M.D., B.Sc. Lond., F.R.C.S. Eng., Surgeon to the Bristol General Hospital; Professor of Surgery, Bristol University. Bristol: John Wright and Sons, Ltd. 1927. Pp. 674. 17*s.* 6*d.*

WHEN the eighth edition of a book is called for there can be no question of its popularity and success in the past. With the inevitable increase in size and the changes necessitated by the advance of knowledge, it is not, however, always possible to preserve those characters which made such a strong appeal in the earlier editions. A careful examination of the volume before us shows no evidence of flagging interest on the part of the author, and every sign of careful revision and successful effort to maintain the original conception. The information contained in the synopsis, whilst condensed and tabulated to a degree, is reliable, up to date, and complete.

LIGHT TREATMENT IN SURGERY.

By Dr. O. BERNHARD (St. Moritz). Translated from the German by R. KING BROWN, B.A., M.D., D.P.H., Medical Officer of Health, Bermondsey; Lecturer in Public Health, Guy's Hospital Medical School. London: Edward Arnold and Co. 1927. Pp. 317. 21*s.*

IN this book justice is at last done to a pioneer of heliotherapy. For more than 30 years Dr. Bernhard has been applying the good sunshine of the Engadin in his surgical practice and the results are here set out in Dr. King Brown's excellent translation. The book opens with a historical review of light treatment, which reveals the author's familiarity with the classics, whilst a section on light biology gives a good account of the action of light on plants, bacteria, animals, and man, with many original observations. Discussing the part played by pigment, Dr. Bernhard states that it is his impression that patients who pigment best are cured with the greatest certainty and speed with the sun-bath. The analgesic effect of the sun's rays is stressed, and the interesting observation made that light directly stimulates peristalsis, as was seen on exposure of bowel during a laparotomy or of fistulous and prolapsed intestine.

The injurious effects of light are fully set out in the section on pathology. The term "sun-fever" is applied to the acute inflammation with great redness of the skin and rise of temperature which may follow an injudicious first exposure. Diseases due to sensitisation, endogenous and exogenous, are also dealt with. Following a description of sunlight therapy, there is a section on treatment with artificial light. The quartz lamp is used by the author when sunlight is not available. In the chapter on indications for sunlight treatment in surgery, Dr. Bernhard states that it was the effect of sunlight on a badly healing wound that caused him to adopt the same treatment in sinuses and tuberculous ulcers. As a result of the successes obtained he began to treat closed tuberculous lesions. Favourable results obtained with ulcers, burns, and frost-bite are recorded, also the closing of fæcal fistulæ. Skin-grafts laid on dry granulating surfaces and exposed to the sun adhered firmly in 15 minutes, requiring no dressing.

"It is in surgical tuberculosis," Dr. Bernhard says, "that the greatest triumphs of sunlight treatment are obtained." All sufferers from this condition, even if there is only one focus of disease, are regarded as tuberculous individuals, and conservative treatment, especially in children, is urged. In comparing 302 cases, exposed to fresh air only, with 1163 cases treated with sunlight, he states that the duration of the healing process is shortened and operative interference less frequently necessary in the irradiated cases, though a few remained refractory to heliotherapy. The technique used is important. A strong local actinic and thermic stimulation is aimed at, and therefore local irradiation leading to pigmenta-

tion precedes general light-bath treatment. Major operative measures were used chiefly when, for economic reasons, it was found necessary to hasten a cure. The author states that at the present time his operative work is largely restricted to punctures, injections of iodoform emulsions, small incisions, scrapings, and special osteotomies. Many photographs illustrate the good results which Dr. Bernhard has obtained.

MALIGNANT TUMOURS.

Die Klinik der Bösartigen Geschwülste. By Geh. Rat. Dr. P. ZWEIFEL and Geh. Med. Rat. Prof. Dr. E. PAYR. Vol. III. Leipzig: S. Hirzel. 1927. Pp. 650. M.76.

THIS volume of a comprehensive work gives an account of the clinical features of malignant disease of the breast, and of the female generative organs. Much knowledge is collected between its covers, systematically arranged in the usual efficient German fashion, and well illustrated, a number of the pictures being in colours. Surgical and other methods of treatment are all fully described, including good accounts of X ray and radium therapy. There are interesting chapters on the vaccine treatment of cancer and malignant disease in animals. Appended to each section is a useful list of relevant publications.

URINARY SURGERY.

Second edition. By WILLIAM KNOX IRWIN, M.D., F.R.C.S. Edin., Surgeon to Out-patients, St. Paul's Hospital for Genito-Urinary Diseases. London: Baillière, Tindall and Cox. 1927. Pp. 271. 10*s.* 6*d.*

THIS is an enlarged edition of the author's surgical urology and is a useful little book for the practitioner. The subject is approached from the point of view of the most prominent symptoms, and although this method of describing disease has many drawbacks, yet the call for a new edition shows that the author has made a success of it. A new feature of this edition is outline descriptions of operative procedures.

EVERY WOMAN A NURSE.

By EDITH NEWSOME. London: Humphrey Milford, Oxford University Press. 1927. Pp. 204. 3*s.* 6*d.*

THIS small book is a revision of one published in 1916, having additional chapters on hygiene of children, on simple remedies, and on first aid; it is especially prepared for use in the home, for societies and schools. The chapters are good and the remarks on bandages should be exceptionally helpful to amateurs in sick nursing. Many of the illustrations, however, are inappropriate to home treatment, and terms are sometimes used and instructions given which would not be comprehended by the untrained. More information might perhaps have been given about the care of incipient tuberculosis.

HYGIENE AND PUBLIC HEALTH.

A Treatise on Hygiene and Public Health. Sixth edition. By BIRENDRA NATH GHOSH, F.R.F.P.S. Glasg., Examiner in Hygiene and Pharmacology, University of Calcutta and State Medical Faculty of Bengal. Calcutta: Scientific Publishing Co. 1927. Pp. 667. 10*s.*

THE author of this book justly claims that its usefulness has been increased by thorough revision and the introduction of a number of new subjects. No discovery of importance in relation to the practice of preventive medicine fails to receive some reference, and a special chapter on diet in India has been added. The result is as complete a survey of the field of public health as can be expected in a book of this size. The unevenness characteristic of such efforts at revision is noticeable. For instance, a fairly adequate statement of the modern conception of ventilation in the chapter on air is followed in the succeeding chapter by the repetition of the old idea that the amount of air required for ventilation largely depends on the amount of impurities present; and the idea that "diseases like cholera, enteric fever, erysipelas, measles, scarlet fever, &c., are aggravated by sewer gas" is surely obsolete. Generally speaking, the book follows the established lines of English short text-books on hygiene and sanitation, and, although frequent reference is made to the problems peculiar to India, it can hardly be said that it conveys in true perspective a picture of the field of hygiene in that Empire. It is, however, well put together and indexed, and is as good a short book on Indian hygiene as we have seen.

THE NORMAL DIET.

By W. D. SANSUM, M.S., M.D., Director of the Potter Metabolic Clinic, Santa Barbara, California. London: Henry Kimpton. 1927. Pp. 136. 6*s.* 6*d.*

IN this book Dr. Sansum discusses the basic principles to be considered in the selection of a normal diet, and provides an extensive series of menus which fulfil the required conditions. To appreciate it fully the reader must be familiar with such things as Lima bean muffins, frozen apricots, Chiote, Swiss chard, and summer squash. But for the initiated the function of the book is fully discharged.

OPHTHALMOLOGY.

A Handbook of Ophthalmology. By HUMPHREY NEAME, F.R.C.S., Ophthalmic Surgeon, University College Hospital; and F. A. WILLIAMSON-NOBLE, F.R.C.S., Assistant Ophthalmic Surgeon, St. Mary's Hospital. London: J. and A. Churchill. With 12 plates containing 41 coloured illustrations and 194 text-figures. 1927. Pp. 312. 12*s.* 6*d.*

STUDENTS attending the practice of an eye hospital or working in the ophthalmic department of a general hospital will find in this work a reliable guide to the examination of the eye and to the great bulk of eye diseases they are likely to meet. No claim to originality is made by the authors, and for the most part the teaching is in accordance with that of larger works, such as Fuchs's text-book. The newer methods of perimetry and of slit-lamp examination are not included, nor are rare diseases or unusual operations. The descriptions of the principal operations performed on the eye are easy to follow. In the chapter on cataract the relative advantages of simple extraction, extraction with complete iridectomy, and extraction with peripheral iridectomy are well set out. The operation recommended in favourable cases is simple extraction, on the ground that there is no chance of the lens capsule getting entangled in the lips of the wound. The book forms a good groundwork for the student fresh to the subject, and the figures enhance the value of the text. One of the most valuable features is the inclusion of 40 coloured illustrations, mostly of fundus conditions, from Hamblin's collection, all drawn from life by expert artists.

JOURNALS.

ARCHIVES DE MÉDECINE ET DE PHARMACIE NAVALES. Vol. CXVII., No. 2.—The current number relates of antimalarial work recently done in Italy at Porto Torres, in the north-west of Sardinia, by Médecin (Surgeon-Lieut.) Dr. Cluzel, of the French Navy. Porto Torres has only 6000 inhabitants, but considerable hydro-electric works in its neighbourhood were projected and increased export trade was hoped for. But the 60 per cent. incidence of malaria stood in the way. So an experimental antimalaria station was established on the spot by the Central Committee in

Rome, with the coöperation of the International Health Board of the Rockefeller Foundation. It appeared at once there were no sufficient funds for large works, so merely "piccola bonifica" was attempted. The staff of the experimental station comprised a doctor and a nurse, who were on duty all the year, and a sanitary engineer and two workmen, who operated from May to November, seven months. The doctor, when cases came or were brought to him, recorded their splenic indices, hæmoglobin percentages, and their particular malarial infections, and prescribed treatment, the rule being, for adults (and children according to their ages) for six days, 25 gr. of quinine daily, for the next 14 days 12 gr. every day, and 10 gr. daily for 40 days thereafter; unless they were then parasite-free the course was repeated. Thanks in part to the nurse, who takes round quinine and hunts up undeclared cases, patients come for treatment very regularly. The doctor also studies the growth of larvæ (for the identification of species), examines mosquitoes to determine the frequency of their infection, notes the proportions of males and females captured in places (males live at the spot where bred, but females travel), does precipitin reactions to decide with what blood females are gorged, takes the pH of the water in pools (for light on breeding possibilities and hindrances), colours live mosquitoes for identification of distances flown before recapture, and examines dead larvæ for Paris green (seen in their digestive tube). The engineer's work extends over a circle of 3-kilometre radius round Porto Torres, mosquitoes being thought not to fly farther, and he has this area mapped in sectors, regularly visited, with the larva-pools, as well as the usual shelters for adult mosquitoes—houses and stables—marked. The great breeding place is in the slow stream Turitano, 3 feet deep and from 4 to 20 yards wide, on which the town is built. If there was to be no drainage or clearing done, oiling would seem to be needed, but on account of expense Paris green was substituted. Treatment of the water every eight days keeps it quite free, and preliminary weed clearing is unnecessary. After 24 hours the poisonous particles sink to the bottom where they are dealt with by micro-organisms, and the water is harmless to men and cattle. The results are that anopheles have disappeared from the 3-kilometre circle, 7 (not 360) fresh cases of malaria occurred in the summer of 1926, and the expense in 1925 was 7*d*. per inhabitant. Oiling would have cost more in material and labour; clearing of the river's course would have been necessary, the water would have been spoiled for cattle, and the result could hardly have been bettered. Dr. Cluzel's is a valuable and exhaustive paper.

THE WEST AFRICAN MEDICAL JOURNAL.—A new medical journal is to be published quarterly from Lagos at an annual subscription of 20*s*. The colonial editors are, for Gambia and Sierra Leone, the Director, Medical and Sanitary Service, Freetown; for the Gold Coast, the Director, Medical Research Institute, Accra; and for Nigeria, the Director, Medical Research Institute, Lagos. The first issue consists of 12 pages composed for the most part of original contributions and illustrated by one excellently reproduced photographic plate of four surgical cases by Dr. Clive Sharp. The new journal is ushered in favourably, for it has as a prototype the *Kenya and East African Journal*, which is already well established. The aims of the editors go beyond the recording of official statistics and staff changes; they intend the new organ to assist in the knitting together of the personnel of a widely scattered service, many of whom by reason of space are unknown to one another, and in the encouragement, as one of the editorial staff says, "of that spirit of patient research and inquiry, that critical faculty, that desire for advancement of knowledge of disease which are our heritage from our great master, Patrick Manson." The aim is to make the journal a medium for the free and frequent exchange of ideas between the members of the staff and also between medical practitioners. Success should follow a venture wisely conceived.

Reports and Analytical Records.

WEINBERG'S SPECIAL NO. 1 SIZE TURKISH CIGARETTES.

(MESSRS. WEINBERG, 3, CARLISLE-STREET, LONDON, W.)

THE box examined contained 25 cigarettes each weighing 1·63 grm. (25·1 gr.); approximately 17 cigarettes weigh 1 oz. The paper of each cigarette weighed 0·74 gr. On analysis the following results were obtained:

Moisture	.. .. ..	14·52 per cent.
Total ash	.. .. ..	15·56 „ „
containing sand	.. ..	2·46 „ „
Nicotine	.. .. ..	0·97 „ „

The paper of these large cigarettes is of good quality. The Turkish tobacco used in their manufacture is of a high grade and quite free from stalk and midrib. The cigarettes burn evenly and are cool to the throat. The percentage of nicotine is distinctly low.

MINTIPS.

(MINTIPS, LTD., SLOUGH, BUCKS.)

MinTips is a "hard" sweet, opaque white in colour, convenient in size, and each piece is wrapped in waxed tissue paper. MinTips have a very pleasant, refreshing mild flavour of peppermint. They dissolve slowly in the mouth, are not too sweet, and do not adhere to the palate. They have the effect of keeping the throat moist, and, in consequence, to some extent, are a preventive of thirst. Analysis reveals them as sweets of wholesomeness and purity.

New Inventions.

LONGITUDINAL SINUS WEDGE.

THE longitudinal sinus route in infants for intravenous injections or for the withdrawing of blood is frequently regarded as both dangerous and difficult. Various special needles and needle-holders have been devised to add to the safety of an extremely useful and easy little operation. The "wedge" here

shown is a modified form of various American appliances, but nothing of its kind (apart from specially devised needles) appears to have been hitherto available in this country, and most of the foreign "holders" seem too cumbersome or complicated. The use of the "wedge" with an ordinary needle is shown in the accompanying illustration. The length of needle projecting is judged roughly by pinching up the infant's scalp and thus estimating its thickness. The needle is introduced pointing backwards into the longitudinal sinus at the posterior angle of the anterior fontanelle, and the flat bevelled edge rests on the bony margins at this point. For the withdrawal of blood or the introduction of small amounts of fluid an ordinary Record syringe can be attached to the needle, but where a saline transfusion apparatus is being used it is essential to have some sort of adapter, such as the one illustrated, for facilitating connexion between rubber tubing and the needle. In the case of transfusion blood should be allowed to escape from the needle before the adapter is fixed.

The "wedge" was first made over two years ago for use at the Hospital for Sick Children, Great Ormond-street, and is now obtainable from Messrs. Allen and Hanburys, 48, Wigmore-street, W.

ALAN MONCRIEFF, M.D., M.R.C.P. Lond.

THE LANCET.

LONDON, SATURDAY, NOVEMBER 5, 1927.

THE ACTION OF LIVER IN PERNICIOUS ANÆMIA.

A PAPER contributed to our present issue by Dr. J. H. ANDERSON and Dr. E. I. SPRIGGS draws attention again to the encouraging results attributed to the Minot-Murphy diet in the treatment of pernicious anæmia. Though these results raise a hope that we may at last have an effective weapon against this hitherto fatal disease, lapse of time alone can decide its full value, and it is well not only to remember the dramatic relapses and remissions natural to the condition, but to consider also our almost complete ignorance of the rationale of the new treatment. The therapeutic action of liver does not seem to be specific for pernicious anæmia, for it is also observed in the experimental secondary anæmias of animals and in sprue. The morbid states of sprue and Addisonian anæmia may in exceptional cases come to resemble each other so closely as to be indistinguishable, and of recent years the same ætiological agent, a yeast, has been ascribed to both. Yet there can be little doubt that sprue is a clinical entity, and distinct from pernicious anæmia, in spite of the facts that the two conditions are accompanied by a glossitis of similar type, and that achylia, together with the symptoms (if not the physical signs) of spinal cord changes, and the characteristic blood picture of pernicious anæmia, may occur also in sprue. For whilst achylia, severe anæmia, and, to a lesser degree, changes in the cord, are almost constant in Addisonian anæmia, they occur only as somewhat exceptional incidents in the long drawn-out course of sprue. We know that various forms of anæmia due to internal hæmolysis, whether consecutive to the inhalation of arseniuretted hydrogen gas, the harbouring of the *Dibothriocephalus latus* parasite, or the morbid syndrome of pernicious anæmia, may produce an identical blood picture, and it is evident that we cannot deduce from a similar blood state a common causative factor.

Liver soup has been used for many years in the treatment of sprue, as Dr. G. CARMICHAEL LOW and Dr. W. E. COOKE point out in the paper which appears on p. 960; but the use of liver for the cure of the anæmia has only received due recognition as a sequel to our acquaintance with its effect in pernicious anæmia. The fact that its effect is not specific suggests that the therapeutic substance it contains is not of the nature of an antibody to the infecting agent, but rather that it acts as a general stimulant to blood formation, as do iron and hæmoglobin, or possibly that normal liver supplies a substance or substances which in certain morbid states are deficient. Such conceptions are strengthened by the apparent necessity for continuing its administration indefinitely, since—up to a period of three years, at any rate—relapses may occur if the treatment is stopped. If liver acts by merely stimulating the marrow it is clear that its effect cannot be due to the iron or hæmoglobin which it contains, for a liver fraction has been separated which is said to be equally effective, although almost free from protein and iron. Further, in pernicious anæmia a constant and noteworthy effect of liver treatment is the rapid disappearance of the glossitis, and it is also claimed that the cord symptoms improve or fail to develop. It is difficult to correlate these effects either with the marrow-stimulant conception, or with the theory of G. H. WHIPPLE and F. ROBSCHEIT-ROBBINS that pernicious anæmia is a deficiency disorder due to lack of some essential in the stroma of the red cells, unless we assume that the damage to the cord and buccal lining is done by the products of hæmolysis rather than by the hæmolytic agent itself.

The evidence that internal hæmolysis is the main underlying factor in pernicious anæmia appears to be almost overwhelming. The widely accepted theory that the hæmolytic agent is derived from bacteria which gain entrance by the mouth to the intestine owing to the absence of an effective gastric juice, has been ardently supported on somewhat loose circumstantial evidence, but necessarily lacks the solid basis of direct proof. The main bacteriological agents implicated have been hæmolytic streptococci, yeasts, and the *Bacillus welchii*. The arguments in favour of the intestinal toxin theory are summarised on p. 961 by Dr. STANLEY DAVIDSON, who adduces evidence involving the *B. welchii*, and advances our conception of the ætiology of pernicious anæmia a stage further by supposing a breakdown in the detoxicating function of the liver. According to this view the chain of events would be achylia, increase of the intestinal flora, and, in particular, of *B. welchii*, followed in certain cases by liver failure and the unrestricted action of the toxin upon the blood. Such a conception has the advantage of simplicity, but it must be admitted that our knowledge of the detoxicating action of the liver is mainly confined to its effect upon phenol, and that even if the liver has the power of neutralising bacterial toxin derived from the intestine it is hard to believe that such action can be replaced by the administration of cooked liver by the mouth. It should be remembered, too, that eminent investigators are still producing evidence in favour of the belief that pernicious anæmia is a state of faulty blood construction and not a hæmolytic disorder. Should the liver treatment, as we hope, stand the test of time it will not only mark an advance in treatment, but should throw light upon the ætiology of an obscure malady. At the moment it appears difficult to reconcile its effect with our two main conceptions of the underlying cause of the disease, but further knowledge of the nature and mode of action of the liver substance may help us to decide which conception is the right one, unless indeed both are wrong.

THE DIAGNOSIS OF POLIOMYELITIS.

IT is never a good thing for a disease to be popularly known by the name of its final and least curable stage, and it is well that the term "poliomyelitis" is steadily replacing the older "infantile paralysis." Although cases without paralysis were described by C. S. CAVERLY, of Vermont, as long ago as 1894, and although absolute paralysis occurs in less than 20 per cent. of cases, yet the early diagnosis of the condition in its systemic and susceptible phase is a comparatively recent achievement. Indeed, Dr. F. M. R WALSHE, in the discussion at the Medical Society of London last February, declared that "unless in the presence of an epidemic, or of well-developed general and meningeal reactions with the characteristic intermission between them, diagnosis before the appearance of paralysis is likely to remain exceptional."[1] If the disease is to be tackled successfully,

[1] THE LANCET, 1927, i., 327.

however, early and yet earlier diagnosis is essential, and it is encouraging to find a slightly more optimistic view taken by Dr. J. P. LEAKE in a recent number (Oct. 7th) of the *Public Health Reports* of the U.S. Public Health Service. His paper appears between a paragraph recording 4570 cases of poliomyelitis, reported in the United States between July 3rd and Oct. 1st, and a table showing the steady increase in its incidence from January to September of this year.

Dr. LEAKE follows Dr. WALSHE in classifying the stages into three: systemic, meningitic, and paralytic. He admits that diagnosis in the first phase can only be a matter of probability. He stresses two features which were noted in the Broadstairs outbreak—constipation and retention of urine. Other observers, however, have found diarrhœa more common than constipation. A curious contrast to many systemic infections is found in the rarity of convulsions, while the absence of herpes labialis helps to distinguish poliomyelitis from epidemic meningitis. Dr. LEAKE concludes that, if there is an epidemic in the neighbourhood, a tentative diagnosis of poliomyelitis is justified by fever, vomiting, constipation, drowsiness, and irritability, especially when these are combined with headache, transient flushing, abnormal sweating, and retention of urine. The usual moderate leucocytosis may be replaced by a leucopenia. With the onset of meningeal symptoms we are admittedly on firmer ground, and Dr. LEAKE maintains that systemic symptoms combined with pain or resistance on spinal flexion, local hyperæsthesia, and tremor, would be sufficient for a presumptive diagnosis of poliomyelitis in the absence of signs more indicative of some other disease. In common with most American observers, he relies on the pain and stiffening elicited by an attempt to lift the child with one arm under its flexed knees and the other under its neck. A very persistent symptom, in his experience, is popliteal pain, due to hypertonicity of the hamstring muscles. Examination of the cerebro-spinal fluid is of such value that 100 per cent. accurate diagnosis from it has been claimed. Dr. LEAKE, however, disagrees with Dr. JAMES COLLIER that lumbar puncture "does no harm,"[2] and regards the danger of subarachnoid hæmorrhage as so great in unskilled hands that he deprecates the operation as a means of diagnosis. History and thorough examination will, he says, afford quite as reliable an indication of the condition. The hyperæsthesia may be cutaneous, muscular or articular, and is apt to be mistaken for rheumatic pain. It is, however, unaccompanied by swelling, and involves areas corresponding to segments of the spinal cord. Anæsthesia is rare, and if present at all is local and inconspicuous. Tremor, brought out by muscular action or the extension of unsupported limbs, is characteristic, and unsteadiness in action and gait may amount to ataxia. In the irritative stage the reflexes are irregularly increased, and a diminution is the first sign of degenerative changes in the peripheral motor neuron. Even with the minor reflexes a constant discrepancy between the two sides is significant. The lumbar and epigastric reflexes should not be forgotten, as they may give a hint of incipient paralyses in the dorsal and abdominal muscles. The gluteal, scapular, pectoral, cremasteric, and plantar reflexes are also useful.

Dr. LEAKE gives some useful hints on the technique of examination, reminding the practitioner of the advisability of keeping a pain-test until the end with small children, and of the importance of obtaining confidence. Reflexes must be tested repeatedly, under the most favourable conditions, and may require reinforcement. The conventional patella-hammer is, he says, useless for eliciting deep reflexes, and a special one should be improvised from stout wire and two soft rubber erasers, one $2\frac{1}{2}$ in. by $\frac{5}{8}$ in. by $\frac{3}{4}$ in., for small babies, and the other $2\frac{3}{8}$ in. by $1\frac{3}{4}$ in. by $\frac{1}{4}$ in. One end may be bevelled with a sharp knife to give precision. The knee-jerk should be elicited in the recumbent position, with the knee semi-extended at an angle of 120°; the doctor's hand on the thigh ascertains the response of the muscle. Half a wooden tongue-depressor, broken diagonally, is better than a pin for testing superficial reflexes. All the movements of the limbs should be tested repeatedly to detect lack of tonus and of resistive efforts, which may be very definite even in the tiny baby. The enthusiast must not forget, however, that in the acute stage the child's chief need is rest in bed, and to make a sick child walk across the room is to defeat the end in view. Usually the examination can be divided over several visits. In Dr. LEAKE's concluding words: "The diagnosis of poliomyelitis is not a simple matter, depending on a single factor or sign, but the whole history and physical examination must be taken into consideration; and when that is done, there are enough idiosyncrasies and predilections of the disease to enable a diagnosis to be made with as great certainty as is usual in the diagnosis of other diseases, even without what was formerly considered the essential feature of the malady—permanent paralysis."

[2] THE LANCET, 1927, i., 321.

RETIREMENTS IN THE PUBLIC HEALTH SERVICE.

Two medical officers of health have recently retired after long service in metropolitan boroughs.

Dr. H. R. KENWOOD became medical officer for Stoke Newington on Sept. 30th, 1894, after having held a similar position at Finchley. His 33 years' tenure of office gave ample scope to a gift of sound administration and the opportunity of pioneer work in several directions. Stoke Newington was the first metropolitan borough to provide (in 1900) for the voluntary notification of phthisis. By 1907, when child welfare centres were almost unknown, Dr. KENWOOD had established a centre in the borough and had enlisted the assistance of a body of voluntary workers. As the result of a series of local experiments Stoke Newington was the first sanitary authority in the country to use formaldehyde for the surface disinfection of rooms in lieu of sulphurous acid. In 1901, as the result of tests made on himself, Dr. KENWOOD took a strong line against the addition of chemical preservatives to food and succeeded in getting their use appreciably reduced in his area. Three years later he became Chadwick Professor of Hygiene in the University of London. During the war period, when he became one of the three civilian sanitary advisers to the Army Council, he was still able to continue his local public health work and proceeded to organise a creche with valuable results. His influence in the public health world extended far beyond the boundaries of his area, the administration of which, however, provided him with opportunities of keeping in touch with the everyday problems of sanitation and of maintaining a salutary sense of proportion in hygienic work. Prof. KENWOOD's term of service was honoured at a complimentary dinner given at the Connaught Rooms on Oct. 6th, when he was presented with an illuminated address, and in replying to the toast of his health remarked on the welcome growth in recent years of the community impulse towards health.

Dr. JOSEPH PRIESTLEY entered upon his public duties in Lambeth on June 27th, 1895, and relinquished them at the end of last month. He gained experience at Camberwell and Leicester before serving for 32 years as chief officer of the public health depart-

ment to one of the largest boroughs of the metropolis. Here he was successful in building up a satisfactory health unit. Not only did he supervise with extreme conscientiousness what is perhaps the most troublesome and difficult sanitary work of a metropolitan borough—namely, the housing of the people—and strive to the utmost to keep up a satisfactory standard, but he devoted much time and thought to the administration of the tuberculosis dispensaries. Owing to Dr. PRIESTLEY the public health equipment of Lambeth is singularly complete. There is a municipal maternity home, a municipal milk depôt, and a municipal bacteriological laboratory. All this work was achieved with a minimum amount of friction; he was esteemed a very courteous official by his Council. Of late years his reputation was enhanced by a piece of epidemiological work which has now become a classic—the tracing of a local outbreak of food poisoning in South London to a paratyphoid carrier. Dr. PRIESTLEY holds the highest position in the esteem of his public health colleagues, and for some years was elected one of the two hon. secretaries of the Society of Medical Officers of Health. He was honoured on Oct. 27th at the Lambeth Town Hall by a presentation from his fellow practitioners. On this occasion Dr. PRIESTLEY remarked upon the decrease during his term of office of the general death-rate in Lambeth from 19·5 to 11·5 and of the infantile mortality from 152 per 1000 births to 38·4, but he disclaimed credit and responsibility for the fall of the birth-rate during the same period from 31·9 to 24·1. "All I have been able to do," he said, "has been to counteract the bad effects of this lessening of the birth-rate by a correspondingly greater lessening of the mortality-rates, leaving a net balance to the good so far as Lambeth is concerned."

Annotations.

"Ne quid nimis."

THE ÆTIOLOGY OF MEASLES.

THE search for the causal agent of measles is still being actively pursued, and at the recent meeting of the American Medical Association William E. Cary and Lois H. Day, of Chicago, reported the isolation of a small green-producing, Gram-positive, short-chained streptococcus from the tonsillar secretion of 93 out of 98 patients who were in the early eruptive stage of the disease. The organism, they say,[1] grows well aerobically in 24 hours, producing a green surrounding zone three times the size of the colony. This green-producing coccus persists in the throat after the patient ceases to be contagious epidemiologically, but the type of colony which it produces changes definitely as the patient's temperature becomes normal. Berkefeld filtrates of throat washings, when injected into rabbits, produce a rise of temperature from 0·8–3° F., and a distinct rash is said to have been noted in one case. In one rabbit cardiac puncture yielded a pure culture of a green-producing diplococcus; in others a similar organism could be cultivated from the blood; whilst in 11 out of 21 cases the coccus was isolated from the conjunctival secretions. Large amounts (10 c.cm.) of whole-broth cultures of the organism injected intratracheally or intravenously cause a slight rise of temperature and a definite erythematous rash. Fermentation tests showed that acid production in salicin, while not invariably produced, is of value in differentiating the organism. Agglutination tests with the serum of patients convalescent from measles, and with strains of the green-producing diplococcus, gave very indifferent results. Tests with the filtrates of broth cultures of the organism on the lines of the Dick reaction have not yielded consistent results.

In a discussion on the above results, Dr. W. H. Park, of New York, said that his experiments with the organisms isolated by Ruth Tunnicliff and by Ferry and Fisher, lead him to believe that these cocci were only concomitant organisms, and not the causal agents of measles. He thinks that measles is due to a real filtrable virus, and not to any organism of the size of the green-producing streptococcus. His experiments with Tunnicliff's toxin have not shown any distinctive difference in the cutaneous reactions of those who have had measles and those who have not. Dr. W. T. Harrison, of Washington, D.C., said that he had been working with Dr. R. Degkwitz in Pfaundler's clinic in Munich, and gave an interesting description of Degkwitz's recent work. Material from the nose and throat was inoculated into dilute human plasma and incubated overnight, and the culture was filtered through a Berkefeld N filter. The filtrate was inoculated into human blood plasma diluted 1 in 7, and rendered semi-solid by the addition of calcium chloride. Transfers to fresh medium were made every six days, sheep serum being added to the medium, and the proportion increased at each transfer, so that at the fourth subplant sheep serum alone was used. The green-producing diplococcus of Tunnicliff was used in alternate cultures as a symbiont. At the third transfer the Berkefeld filtrate of the culture was inoculated into monkeys which later developed febrile symptoms. The blood from these animals was inoculated into further monkeys, and the transmission was accomplished to the fourth generation. The serum of the recovered monkeys was used in protection experiments on susceptible children, and protection was conferred in every case. Normal monkey serum had no such effect.

There is still a bewildering array of micro-organisms of various sizes, each regarded as the causal agent of measles, and more work is needed before the actual incitant of the disease can be identified with certainty.

[1] Jour. Amer. Med. Assn., Oct. 8th.

THE EXPLOITS OF A CAVALRY FIELD AMBULANCE.

THE rapid advance of the cavalry which opened Lord Allenby's victorious campaign in Palestine in September, 1918, involved great difficulties for the field ambulances of the swiftly moving cavalry brigades, only met by the wise foresight of the commanding officers, and the devoted work of other ranks and followers. It is instructive to read, in the *Journal of the Royal Army Medical Corps* for September (p. 161), the account by Lieut.-Colonel H. F. Humphreys, M.C., of how all difficulties were successfully met. These must have been great where a combined (British and Indian) field ambulance was in question, with no I.M.S. officer, no European who could talk Hindustani, none who could understand the Egyptian camel drivers. The intended operations were not disclosed until Sept. 17th at Ramleh, when reorganisation had to be completed, necessary stores decided and drawn, and camels and remounts obtained, all within two anxious days. The unit was divided into a mobile (bearer and tent) section and another, less mobile, to be a divisional clearing station. The tent and bearer sections marched from Selmé at 6 A.M. on Sept. 19th to Beisan, doing the 90 miles in 38 hours, and arriving complete. The heroes of this march were the 24 donkeys which, carrying each an Indian follower, had themselves no one casualty, not even a sore back. On Sept. 25th the bearer section marched off across the Jordan with the brigade for Damascus through the desert. The tent section, left behind to evacuate sick and wounded to Haifa, followed next day, without guard or convoy, rejoining most creditably at Damascus on Oct. 2nd. But it is the camel convoy which gets the highest praise, 20 camels, their drivers all Egyptians, with but one British soldier, Private R. A. Gibbs, R.A.M.C., and he in command. The convoy marched by itself three days through the desert, without map, compass, guide, or guard or arms, among marauding Arabs and Turkish stragglers, and rejoined at Damascus on Oct. 4th. When supplies ran short Gibbs traded,

at the villages, discarded Turkish equipment he had collected, such as boots, and so got camel fodder, eggs and milk. He defended his convoy once with a Turkish rifle and ammunition he had picked up. We are glad to see he got the Military Medal. As Colonel Humphreys remarks, the responsibility that may fall in war on a private, R.A.M.C., requires they shall all be Class A men. An outburst of malaria began at Damascus about Oct. 3rd, and on 4th, 5th, and 6th 200 cases passed through the mobile section of the ambulance, which marched on and reached Baalbek on the 15th. It evacuated cases to Damascus till Oct. 12th, and thereafter to Beyrout. Altogether, though itself crippled with malaria, it dealt with 1307 casualties in October, 90 per cent. of them malarial. The less mobile section marched up by the Sea of Galilee, losing heavily by malaria, indeed two-thirds of its British personnel, the commanding officer (Captain S. R. K. Thomson) having to drive a wagon. In five weeks to Oct. 31st this section took in 1314 cases. It ultimately rejoined headquarters at Baalbek on Nov. 9th. Individuals as we have seen did well. When so many in a unit are exceptionally efficient much praise must be due to the leading of the commanding officer. Colonel Humphrey's story of the campaign is well worth reading.

THE CONCENTRATION OF HÆMOGLOBIN IN THE BLOOD.

IT has been well known for a long time that exposure to low oxygen pressures results in an increase in the quantity of red cells and hæmoglobin per unit volume of blood, and the observations of Haldane and Douglas on Pikes Peak showed that this high altitude polycythæmia was due, not to a concentration of the blood, but to the production of many new red corpuscles as a compensatory hypertrophy. It is not so clearly recognised that breathing atmospheres containing excess of oxygen leads to a diminution in the red cells and hæmoglobin. Doyon and Morel [1] showed long ago that rabbits kept in a caisson in compressed air for three weeks became anæmic, and Dr. J. A. Campbell in two recent papers [2] has produced more ample evidence. He worked with monkeys, rabbits, guinea-pigs, rats, and mice exposed to air containing about 50 per cent. oxygen at atmospheric pressure and found that the percentage of hæmoglobin fell by a quarter to a third—the details differing a good deal in the various experiments. The number of red cells per cubic millimetre and the percentage of hæmoglobin are, then, functions of the oxygen supply, and what we call the "normal" figures depend on the accident that most of us live in an atmosphere containing 21 per cent. of oxygen at a pressure of about 760 mm. of mercury. The "normal" hæmoglobinometer figure for people living high up in the Andes is perhaps 130 per cent. on the ordinary scale; if anyone could get deep enough into the earth to have the air pressure doubled or lived in some place where the air had twice the ordinary amount of oxygen, the "normal" figure would no doubt be 80 per cent. or thereabouts. The facts indeed make one wonder whether after all the environment we live in is as good as it might be. Hæmoglobin is not much use unless it goes round the body, and the trouble about sending a great deal of it round the body quickly enough is that the red cells in which it must be carried make the blood inconveniently viscous. The polycythæmia of high altitudes passes off quickly enough on returning to sea-level; the body does not like it because it throws more strain on the heart. Similarly, the polycythæmia produced by transfusion is soon corrected by arousing an active destruction of the red cells which the body can do without.

We judge therefore that the "normal" concentration of red cells is a compromise between the oxygen supply and the work of the heart; it presumably represents the least viscous fluid which will carry the minimum necessary amount of oxygen. And it would seem to follow that we should do better if our air contained 40 or 50 per cent. of oxygen instead of 21 per cent. Atmospheres of anything near pure oxygen are well known to be harmful if breathed for any length of time, but there is no evidence in Dr. Campbell's experiments or elsewhere that doubling the ordinary amount would do any harm. Extra oxygen improves the physical capacity of normal people over short periods, as Dr. Leonard Hill showed. But continued life in it would lead to a relative anæmia, the oxygen supply to the tissues would remain where it was, and the benefit which would accrue would come from putting the heart in the easy position which we now give it by lying down. Perhaps it, too, would grow smaller.

Dr. Campbell also gives some very interesting data about the colour-index. In animals which become polycythæmic from diminution of oxygen there is the diminution of the colour-index which usually accompanies active blood formation, but it rises considerably in those which become relatively anæmic from living in high oxygen pressures. There seems no other explanation of this than to assume that the red cells normally present in the blood are on the average immature; if the demand for red cells is diminished there is time for them to develop fully before they come into the circulation. This interpretation is consonant with the facts that a continual need for fresh red corpuscles is associated with either a low colour-index or histological evidence of active regeneration or both. As Prof. Barcroft's expedition to Peru showed, reticulated cells are continually present in the blood of natives living their whole lives at those high altitudes. Immature corpuscles are regularly to be found in small animals like rats and mice which live a shorter time and at a much higher rate than man. A rabbit normally has a colour-index of about 0·7 on the human scale. It seems likely that the really mature red cell contains a good deal more hæmoglobin than we have suspected. A similar rise in colour-index was reported in cases of hunger œdema in Germany during the war, due presumably to the difficulty of making new cells.

[1] Compt. rendus de la Soc. Biol., 1901, liii., 741.
[2] Jour. of Physiol., 1927, lxii., 211; and lxiii., 325.

PLAGUE EPIDEMICS IN THE PAST.

ALL epidemics bring out at once the best and the worst of human nature, but in the records of plague epidemics of the past nothing stands out more forcibly than the hopeless despair of both those attacked and those who expected to be. During the great epidemic of 1348, for instance, there was living in a Franciscan house at Kilkenny a friar by name John Clyn, who kept a chronicle which has come down to us. He notes in very simple language the progress of the plague; how some people died with spitting of blood, obviously the pneumonic form, and how from fear and horror men scarcely dared to carry out the duties of visiting the sick and burying the dead. He ends his chronicle for 1348 by saying "the plague was sore in Kilkenny in Lent, for between March 6th and just beyond Easter, eight preaching friars (i.e., Dominicans) died and in nearly every house there was more than one death for, as a rule, husband, wife, their children, and dependants trod but one way, the way of death."

In an excellent new book on the "Plague in Shakespeare's London," [1] which is really a commentary on Dekker's "Plague Pamphlets," [2] Mr. F. P. Wilson illustrates from contemporary documents the attitude of mind of both the sick and whole during the epidemic of 1625. For the time being it was practically, "Let us eat and drink for to-morrow we die." Many of the clergy and the medical profession, forgetful of their duty, fled to the country, though others,

[1] The Plague in Shakespeare's London. By F. P. Wilson. Oxford: Clarendon Press. 1927. Pp. 228. 12s. 6d.
[2] See THE LANCET, 1926, i., 1 99.

to do them justice, stayed and worked to the death, while some, like Mr. Whitacre, survived.

"Mr. Whitacre . . . escaped not only then, but all the Contagion following without any sickness at all; though he officiated at every Funeral and buryed all manner of People, whether they died of the Plague or not. He was given to drink, seldom could preach more than one quarter of an Hour at a Time."

Mr. Wilson begins his book by quoting excerpts from various sources as to the theories of the causes of the plague, and the various remedies both preventive and curative. It is interesting to note that many of these contained either garlic or onions, both of which are well known antiseptics. But as a rule the medical faculty was hopelessly at sea and we cannot wonder at Margaret Paston's opinion, not a kindly one, when she wrote to her husband in 1464: "For Goddys sake bewar what medesyns ye take of any fisusyans of London; I shall never trust to them because of your fader and myn onkyl, whys sowlys God assoyle." The authorities, however, did do their best to prevent the epidemic spreading, as was shown by the various Plague Orders issued from time to time between 1518 and 1665. These dealt with such matters as sanitation, the provision of a state or municipal medical service (by no means overpaid), arrangements for burial, segregation of the infected, and the establishment of pest-houses for the sick, the first of which was in the parish of St. Giles, Cripplegate. Early in his book Mr. Wilson notes the presence of slaughter-houses in the heart of the City and mentions that the shambles in the parish of St. Nicholas within Newgate "were still a menace to health in 1603," and that in the fourteenth century "the putrefied blood of slaughtered beasts was allowed to run in the streets." It is true that our ancestors had but crude ideas on sanitary matters, but it must be remembered that up to 1855, when Smithfield Market was finally closed, much the same conditions existed as in the seventeenth century. The shambles around Smithfield, Newgate Market, Clare Market, and Aldgate High-street were a disgrace to any civilised town and, except the last named, were only done away with on the opening of the Islington Market. On slaughtering-days blood could be seen running into the gutters in Aldgate High-street at least as late as 1880, and although there was much improvement in recent years the slaughter-houses have only just been closed.

THE ACOUSTICS OF ARTIFICIAL PNEUMOTHORAX.

THE physical conditions under which the coin or bell sound of Trousseau is heard in the chest are not accurately known. In an article which appeared in our issue of Oct. 21st Dr. A. I. G. McLaughlin remarked on the fact that the sound is better marked when the pleura has been thickened or sclerosed by the onset and subsequent absorption of a pleural effusion, and that it is rarely heard where such effusion has not occurred. In a recent publication,[1] Dr. C. Minerbi, Dr. S. Mongini, and Dr. E. Benassi deal in a very exhaustive manner with the acoustics of pneumothorax. Observations were carried out in 50 young women. In all the cases of complete therapeutic pneumothorax of recent standing two distinct tones in Trousseau's bell sound were invariably found—a higher tone corresponding to the extreme points of a diameter extending from the interscapular vertebral space to the base of the mediastinum and a lower tone corresponding to a line uniting the pleural apex with costal margin. The authors also noticed that these two sounds were only obtained when the internal pressure reached a level between zero and +1 of the water manometer—i.e., was not negative. A fact worthy of note is that in the first 24 hours after re-establishing the pressure in an already complete pneumothorax the bell sound cannot be produced even when the pressure has become positive. The authors ascribe this to a marked "oncopleural reflex," due to the sudden trauma experienced by the pleura. This reflex consisting of a dilatation of the lymphatics and the subpleural parietal veno-capillary network, either by local stimulation or by a reflex caused by compression of the large mediastinal veins, increases the thickness and "succulence" of the pleura, and hence diminishes the firmness of its tissue and the capability of the pleuritic cavity to lend itself to the vibrations of its gaseous contents. It is also worthy of note that the higher tone is not usually found in cases of pneumothorax of many months' duration; this depends, in the authors' opinion, on increased vascularisation and consequent softening of the pleura, and the mechanism is of the same nature as the "oncopleural reflex." It seems, therefore, that the acoustics of pneumothorax are capable of various explanations and more researches are necessary before the subject can be completely and satisfactorily elucidated. The work of the Italian authors is painstaking and includes a bibliography of over 100 references.

[1] Archivio di Patologia e Clinica Medica, vol. vi., fasc. 11, 1927.

ENDEMIC TYPHUS IN AUSTRALIA.

IN a recent paper [1] Dr. Frank S. Hone, chief quarantine officer of South Australia, remarks that in three previous communications in 1921 and 1923 he had reported a number of cases resembling typhus fever which had been observed in Adelaide and its suburbs since 1918. During the last four years he has obtained notes of 81 more cases which had been sent to him by more than 25 medical practitioners. The cases in this series presented the same picture as that previously described. The condition was most likely to be mistaken for typhoid fever or measles. In mild cases the patient might not receive medical attention during the initial stage, and only come under observation for a complicating pneumonia in defervescence, when the history and appearance of the skin would suggest the true diagnosis. The prominent points in the clinical history were the headache and the rash. The headache, which was more severe than in typhoid fever, persisted until the rash was well developed. The rash was of the maculo-papular type and petechiæ only appeared in severe cases and at a late stage. The toxæmia varied greatly, being ill-marked in healthy young adults and pronounced in old people and alcoholic subjects. The most frequent complication was hypostatic broncho-pneumonia which was the usual cause of death in the fatal cases. The great majority of the patients recovered. Of the 81 cases only 5 died, a mortality of about 6 per cent.; all the fatalities were men over 60 except a woman, aged 48, suffering from tabes and cystitis. In contrast with European typhus the body louse was invariably absent in these cases. On the other hand, the disease appeared to be closely associated in some way with the prevalence of rats and mice. In its relatively benign nature, absence of lice, and association with rodents as well as in its sporadic character and late appearance of the Weil-Felix reaction, the Australian disease shows a striking resemblance to the tropical typhus of the Federated Malay States and the endemic typhus in the South-Eastern United States to which we drew attention earlier in the year.[2]

[1] Medical Journal of Australia, August 13th, 1927.
[2] See THE LANCET, 1927, i., 36 and 404.

THE RELIEF OF STERILITY IN MAN.

OPERATIONS for sterility in man have not met with much success up to the present time. Bilateral epididymitis is recognised as the commonest cause of sterility, and the operations that have been planned to overcome the sequential blockage in the vasa deferentia or the epididymal canal have consisted in various forms of anastomosis and short circuiting. Unfortunately, the lumen of the vas and of the epididymal canal is so small that however carefully an anastomosis is carried out the cicatrisation that

follows the operation undoes its good effect. Results, indeed, have been so disappointing that most English surgeons have abandoned the attempt to treat sterility by operative means. In place of operation the surgeon has tried to meet the difficulty by the withdrawal of spermatozoa from the testis and the use of artificial insemination, but this merely substitutes one hopeless method for another. It is strange that artificial insemination, which gives good results in the stockyard, should be useless in the human being; even when a good supply of semen is available insemination gives no result. There is excellent material here for research. Apparently all the ingredients are present and yet fertilisation is of the very rarest occurrence; one is almost forced to the conclusion that the absence of the psychic element must be called in to explain its negative results. It is, therefore, incumbent upon surgeons to persevere in the improvement of the technique of anastomotic operations in the hope that some day the almost inevitable occlusion of the duct by cicatrisation may be avoided. The operation for sterility, described by Dr. H. C. Rolnick, of Chicago, in the October number of *Surgery, Gynecology and Obstetrics*, has been planned with this idea in view. Instead of carrying out anastomosis between the vas and the epididymal canal, a junction is effected between the vas and the rete testis; the fact that in the latter structure there exist several tubules instead of one increases the chance of success. In order to diminish the risk of sealing up the end of the divided vas a catgut suture is passed through the last inch of the vas, the rete testis, and the testis itself; this is brought out through the skin of the scrotum and tied on its external surface. The suture also acts as an anchor, preventing movements of the testis by the cremasteric muscle and improves the chance of primary union. It is left in seven to ten days and then removed. The whole object of the operation is to reduce to a minimum the amount of scarring round the site of the junction between the vas and the rete testis, and to ensure that during the process of healing the divided portion of the vas shall remain pervious. The operation is too recent to allow of the author publishing results; it seems to have been satisfactory when carried out on dogs.

THE DUST-CELLS OF THE LUNG.

ANYONE who lives in London and looks with the microscope at a bit of the greyish or brownish mucoid sputum which he coughs up in the morning will see a most exquisite example of phagocytosis of dust particles by large clear cells. It is the normal mechanism which does its best to keep our lungs as clear of extraneous matter as may be. Histological sections of the lung of anyone who breathes dirty air show the same picture which is developed to an extreme degree in mitral stenosis, when the remnants of red blood corpuscles which have oozed through the distended capillaries are taken up in great quantities by the similar "heart failure" cells. It used to be thought that these phagocytic cells came from the epithelium lining the alveoli, irritation leading to their proliferation and detachment. But in recent years this origin has been much disputed, and it has been supposed that they were endothelial cells from the lung capillaries or histiocytes from the alveolar walls. A. Policard (Lyons) has combined two views in his hypothesis, that they come from the lining of the alveoli, and that this is mesodermal rather than epithelial. Dr. H. M. Carleton, of Oxford, has recently [1] re-examined the question in a variety of ways—histology, vital staining, tissue culture—and comes to the conclusion that dust cells are indeed derived from the cells lining the alveoli, and that these are epithelial in nature; in other words, he reaffirms the original interpretation. Phagocytosis by epithelial cells is not really so very uncommon, even in mammals; many cancers show an exaggerated degree of it. These epithelial dust cells are, perhaps, chiefly peculiar in their capacity for amœboid movement, for after picking up particles in the alveoli they will penetrate the lymphatics of the lung, and travel long distances in these vessels and to the bronchial glands.

[1] Quart. Jour. Micros. Sci., 1927, lxxi., 223.

THE NEW R.A.F. HOSPITAL.

THE building opened at Halton, near Wendover, on Monday last will be the principal hospital for the Royal Air Force and already has accommodation for more than 200 patients. At the opening ceremony Sir Samuel Hoare, the Secretary of State for Air, pointed out that there is no intention of duplicating hospital accommodation where military, naval, and civil institutions are available for the needs of the Force. Last year more than 1200 R.A.F. cases were admitted to naval and military hospitals, which proves, he said, a sincere wish to avoid the extravagant policy of insisting upon special arrangements being made for every man in this branch of the Service. At Halton, however, there is no alternative accommodation, and although the Air Force station there is the largest in the world the hospital has hitherto been housed in huts that were erected early in the war and were converted to medical use later. The new building, which we describe on page 995, will not only serve the local camps, but will also be a centre for all R.A.F. cases for which convenient provision cannot otherwise be made, including those from overseas. The Force, said Sir Samuel Hoare, is rightly proud of its medical and nursing service, and the standard of health which it maintains is very high. The most efficient medical and surgical assistance is required to meet the inevitable strains and risks of life in the air, and at the present time, he might have added, there is a real need that candidates of the right type should join the service. Its attractions from various points of view deserve the close attention of men who are not committed to any other form of practice.

CHOLECYSTOGRAPHY AND THE LYON TEST.

CLAIMS for the serviceableness of the duodenal tube have been put before London medical societies recently [1] by Dr. B. B. Vincent Lyon, of Philadelphia. These claims lend interest to articles appearing in the American medical press concerning the relative value of the two main means at our disposal for investigating the pathology of the gall-bladder and biliary passages. Lyon's test, which consists of the examination of the main fractions of bile recovered by duodenal tubage, after the injection of a solution of magnesium sulphate, is readily available to every practitioner who cares to devote the time and care necessary for its performance. Cholecystography, by which the filling and emptying of the gall-bladder are observed radiographically after the oral or intravenous administration of the heavier halogenated phenolphthaleins, can never be performed without expert radiological assistance. It seems, however, probable that when this latter assistance is available the method possesses a higher degree of accuracy than the Lyon test. Such, at any rate, is the opinion expressed [2] by W. W. Boardman, who has made a comparative study of the two methods in a series of more than 60 cases at the Stanford Medical School, San Francisco. Comparing, first, the oral with the intravenous method of dye administration for the X ray test, he finds a very high margin of error when the oral method is employed, more than 50 per cent. of his cases having appeared to be pathological by this method, whereas the intravenous procedure showed that only 12 per cent. were actually incapable of receiving the dye into the gall-bladder. These figures are far from agreeing with those of most observers in this country, and suggest that the technique used for oral administration has left something to be desired. It, however, teaches a lesson that has been learnt here as elsewhere—namely, that failure to visualise the gall-bladder must be accepted with some reserve when the oral method only has been employed. In 11 cases in which both tests were

[1] See THE LANCET, Oct. 29th, p. 918.
[2] Amer. Jour. Med. Sci., 1927, clxxiv., 536.

performed, and in which subsequent operation proved the presence of gall-stones, marked loss of the epithelium, or thickening of the gall-bladder wall, it was found that dark brown "B" bile was obtained in four cases which had failed to fill during cholecystography, and which were the site of definite pathological change when examined at operation. In pointing out this apparent superiority of the X ray test as a means of distinguishing gross disease of the biliary tract, the writer is at pains to remark that the reliability of the Lyon test must inevitably depend to an appreciable extent on the care and experience of the investigator in examining sediment. With a lesser degree of experience, ordinary observers can hardly expect to obtain results as reliable as those described by Dr. Lyon himself.

TRIBUTE TO SIR CHARLES MARTIN.

THE appearance of Prof. C. J. Martin's name in the recent list of Birthday Honours was cordially welcomed by the staff of the Lister Institute as a well-deserved tribute to the high scientific distinction of their chief during the past 24 years. At a specially convened meeting of the staff it was decided that the occasion was a fitting one to present Sir Charles Martin with his portrait as a token of their personal esteem and of their appreciation of his services. Subscriptions to the portrait were confined to the present staff and research workers, and to past members of the staff during Sir Charles Martin's directorate. The portrait by Mr. Neville Lewis has given much satisfaction, and its presentation took place in the library of the institute on Friday last, Oct. 28th, by Prof. Harden, who presided over a large gathering of the subscribers. Speaking as one who could recall Dr. Martin's arrival as director of the institute in 1903, Prof. Harden referred in eloquent terms to the scientific and administrative ability which he had displayed, his versatility and helpfulness; and he laid stress upon the director's personal qualities, saying that his tact had conduced greatly to that domestic harmony and camaraderie which had ever been the pride of the Lister Institute. Sir Charles Martin in response testified to the good fellowship which had always existed among staff and workers, and thus rendered pleasant the years he had spent among them.

THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

LAST year's industrial dispute seriously delayed the building of the new London School of Hygiene and Tropical Medicine, and the premises are not likely to be opened until the spring of 1929. Meanwhile, the work of the school is steadily growing, and three divisions are in working order. The Division of Medical Zoology embraces a great part of the activities of the old Tropical Division; the Division of Bacteriology and Immunology has been a school of the University of London since the beginning of last month, and has a flourishing course for the new Diploma of Bacteriology; whilst the Division of Epidemiology and Vital Statistics has acquired the same status, and is temporarily established at the National Institute of Medical Research. The school's third annual report, which was presented to the governors on Oct. 31st, refers to the proved advantages of the lengthened (20 weeks') course in tropical medicine and hygiene, as now given at Endsleigh-gardens. The director, Dr. Andrew Balfour, leaves for later consideration a proposal to offer shorter courses to medical men who are pressed for time, as also the suggestion that brief courses should be arranged for laymen who are going to tropical or sub-tropical climates. It is felt that the provision of such instruction would be welcomed by business firms and institutions which send their employees abroad. The interest of the business community is likely to be invoked also when the time comes for considering the recommendations of the committee appointed by the Minister of Health to report on the best means of securing clinical and pathological facilities in London for the study of tropical medicine. This committee wanted to see an Imperial Hospital of 150 beds set up in London, and pointed out that such a hospital is needed not only for purposes of research and teaching, but also because there is actual suffering at present unrelieved. A possible site is a strip of land in Malet-street, being part of the land in Bloomsbury lately acquired by the University. It would be appropriate if a large part of the £250,000 required for the erection of an Imperial Hospital were to come from commercial people who stand to gain by the opening up of tropical countries.

WE deeply regret to announce the death on Sunday, Oct. 30th, at Forest Edge, Forest Row, Sussex, of Dr. Henry Patrick Cholmeley, at the age of 68. Dr. Cholmeley was for many years assistant editor of THE LANCET, and his death brings real grief to a large number of former colleagues and friends. An obituary notice will appear next week.

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CCXLVIII.

TREATMENT OF BRACHIAL NEURITIS.

CLOSELY comparable to sciatica in the lower extremity, neuritis of the trunks forming the brachial plexus may arise from a large variety of causes, of which chronic goutiness, rheumatic fibrositis, injury, and infectious fevers are the commonest.

Chronic infection from pyorrhœa, antral abscess or other sinus suppuration, chronic intestinal or renal infection, may be the source of an infective perineuritis affecting one or more cords of the plexus, more commonly the posterior. Acute brachial neuritis is a most painful affection usually developing gradually during several days from pain around the back of the shoulder and upper arm, soon spreading down to the elbow and wrist and into the back of the hand, and even the finger-tips. When the posterior cord alone is involved then the back of the hand and knuckles is the lowest point for the pain to reach. The intensity of the pain, resembling knives cutting or rats gnawing the flesh, may render sleep impossible without the aid of hypodermic injections of morphia or heroin, and complete rest in bed will be essential with the arm supported on a soft pillow or cushion. Fixation of the limb by strapping or bandaging to the side will not be borne as the patient finds change of posture at intervals an absolute necessity, even though movement for the moment aggravates the pain. Moist heat in the form of antiphlogistine poultices or a paste of kaolin with glycerine and menthol heated and spread on lint, and covered with thick wool, may be kept on for hours at a time; or linseed and mustard poultices, the latter very weak, in the proportion of 1 part to 12 of linseed, may be used and changed every four hours. The linseed poultice should be covered with gauze on the side next the skin, avoiding needless mess. Before applying the actual poultice the skin may be painted with glycerine of belladonna or with warmed lin. A.B.C. made of lin. aconit., lin. bellad., and lin. chlorof. in the proportions of one of aconite to two of belladonna and three of chloroform liniment. Half an ounce of warmed tincture of opium may with advantage be added to the linseed meal in making each poultice.

Ol. gaultheriæ, Bengué's balsam, and similar preparations may be used alternately with the belladonna liniment, though patients are apt to tire of the smell of oil of wintergreen. During the daytime, when the poultices are changed, it is a useful variant to give applications of radiant heat to the neck and shoulder. Sun-ray by the tungsten carbon arc-lamp,

or ultra-violet rays from the cooler mercury-vapour lamp, are also a useful form of treatment. Other forms of electrical treatment may also be employed, such as diathermy and salicyl ionisation. The latter is not very easy to apply to the neck and arm, but may best be given through a moist sponge or thick pads of wetted gamgee tissue. Ionisation sometimes aggravates the pain and should then be given up for radiant heat and poultices.

High-frequency currents in the form of violet sparks, or auto-conduction, are quite useless except as a suggestive treatment, but the positive breeze of a large static machine may act beneficially both directly and indirectly. Faradisation should never be employed, and the same applies to massage in the stage of active neuritis. Not until all signs of active inflammation of the nerve-sheaths in the form of tenderness to light pressure and darting neuralgia have passed away may massage be employed. So limited are the movements of the shoulder-joint permitted by a patient in the first two or three weeks of a severe attack, that adhesions in the joint may form, but though the physician is aware of this he must leave the limb as immobile as the patient will allow, at the same time giving warning that eventually such adhesions may require breaking down under an anæsthetic. In rare cases only do periarticular adhesions form in the wrist and interphalangeal joints.

If marked fixation of a wrist has occurred it is almost invariably evidence that the condition is an active infective arthritis and not neuritis at all. I have more than once seen acute arthritis of the shoulder-joint mistaken for neuritis, while it is a common-place to see chronic adhesions in a shoulder-joint as the result either of subacute rheumatism or of a traumatic synovitis resulting from a slight fall or sudden strain of the joint, diagnosed as "neuritis." The marked fixation of the joint with absence of hyperæsthesia or much local tenderness, and a history of pain limited to the shoulder region, and never extending much below the elbow, will at once distinguish this stage of chronic adhesions in the shoulder-joint from an acute neuritis. This is important to recognise, because the immobilisation necessary in the case of neuritis is the wrong treatment for the former condition, which requires passive movements and massage. In a great many of these cases of fixed shoulder, however, passive movements are useless until the adhesions have been well broken down under an anæsthetic. Gas is sufficient, but the limb must be completely uncovered, and the patient laid flat on a bed, so that the arm can be brought well up over the head. In addition to circumduction movements, it is important not to forget to rotate the joint well also. A point worth attention is the risk of dislocation of the shoulder in the action of bringing the arm up over the head during the anæsthetic. During this movement and before letting the arm down, the operator should press his fist into the axilla, thus keeping the head of the humerus from slipping below the edge of the glenoid cavity. The masseuse who is afterwards to perform the daily passive movements of the joint should be present at the operation, and should manipulate the joint under the anæsthetic to give her complete confidence as to the movements possible. The amount of pain following this slight operation varies; it is a good plan to have a fomentation ready to apply as soon as the anæsthetic is over, and a hypodermic injection of gr. ¼ of morphia is generally necessary.

More difficult to treat are the adhesions in the finger-joints which are a sequel in some of the more severe cases of brachial neuritis, accompanied by wasting of the finger-pads and glossiness of the skin. Such adhesions must never be forcibly broken down under an anæsthetic, as this always sets up considerable reaction and swelling with re-forming of the adhesions worse than before. Soaking of the hand in hot soda or brine solutions daily, followed by passive movements of the joints to the limit that can be borne without undue pain, may after many weeks gradually restore the movements of the stiff finger-joints, but the process must not be hurried by too forcible treatment or injury will result.

After the pain of an attack of brachial neuritis has passed off, in four to six weeks or longer, there is certain to be some general emaciation of the limb apart from any local muscular atrophy which may result from the stress of the neuritis damaging any particular nerve-trunk. Massage of the limb may now safely be employed and faradisation best given with the slower interruptions of the Bristow coil, or with wave faradism, produced either by rhythmically sliding the secondary to and fro over the primary, or by passing the current through a pointed electrode dipping in and out of a narrow tube containing water, by the action of a motor or metronome.

By these means the recovery of the general wasting will be hastened. When the stress of the inflammation damages certain nerve-trunks to the extent of causing degeneration of the nerve-fibres, local muscular atrophy will be observed corresponding to the nerve-supply—e.g., atrophy of the serratus magnus when the long thoracic nerve is involved, or of the deltoid in the case of the circumflex. When this degree of damage is done, electrical tests will show the presence of reaction of degeneration—that is to say, the muscle will not respond to the faradic current, but will show sluggish contractions to galvanism, with perhaps stronger reactions to the closure of the current at the anode. Faradism will then be of less use in the treatment of the wasted muscle than reversals or interruptions of galvanic current.

A frequent form of neuritic pain about the shoulder-joint that is generally diagnosed as neuritis is really a neuro-fibrositis, due to a subacute or chronic fibrositis affecting the fascial planes and intermuscular septa at the base of the neck and shoulder. The ætiology of this condition is very similar to that of the more general brachial neuritis affecting the main nerve-trunks, the difference consisting in the situation of the fibrositis, either surrounding or at a distance from the main nerves. The pain in this form of neuro-fibrositis mainly affects the shoulder and base of the neck and does not spread down the arm below the area of the deltoid, except in a few cases which commence as a diffuse fibrositis and spread to the sheaths of the main nerves, when the pains will extend further down the arm, even to the finger-tips.

Local radiant heat, sun-ray lamp or diathermy, ionisation, and poultices will be of service as in the general brachial neuritis, but the pain is less severe and does not cause sleepless nights, requiring the use of morphia or heroin. Careful examination for sources of sepsis of dental or sinus origin must be made and dealt with appropriately. Alcohol in all forms should be forbidden in the acute stages of neuritis, though total abstinence is less necessary in neuro-fibrositis. Diet is of less importance than is often stated, but the meals should be small in persons over the age of 50. Internally, aspirin or salicylates, mild purgation, and sometimes atophan should be tried.

Occasionally these cases become chronic, with persistence of neuralgic pain, especially on certain movements, and a few points may be found especially tender to pressure, particularly around the vertebral border of the scapula or above the suprascapular fossa. These tender points should be carefully located and marked with a dermatograph pencil, and dramatic cures may occasionally be wrought by injecting them with a fine needle, using first two or three drops of 2 per cent. novocaine solution and after waiting three or four minutes injecting 5 minims of 90 per cent. alcohol. Great care must be taken when performing these alcohol piqûres over an intercostal space never to pass the needle through the pleura. To avoid this accident search should always be made with the point of the needle for the rib, this indicating the depth that is safe.

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Special Articles.

THE MINISTRY OF HEALTH:
ANNUAL REPORT.

THE report of the Ministry of Health for the year ending March 31st last contains an interesting summary of the work of the department with respect to public health. Eight years have now elapsed since the Ministry was first formed, and advantage has been taken of the present opportunity of summarising its activities as regards development and organisation. An outline of the volume should stimulate readers to acquire it.[1]

International Work.

In the first place, the report deals with international health work, the Convenant of the League of Nations having placed on the constituent members certain duties relating to public health which were of an international nature. The permanent health organisation of the League has been concerned with the collection and circulation of particulars of the prevalence of epidemic disease, and the provision of assistance to other nations in coping with formidable epidemics, together with such work as the interchange of visits between public health officers working in different countries, and the collection of statistics relating to cancer and tuberculosis. In connexion therewith an International Sanitary Conference was held in Paris from May 10th to June 21st, last year, the object being to revise and bring up to date the work of the International Sanitary Conference of 1912. No fewer than 70 countries participated in the deliberations, and the conclusions of the Conference will be published separately, but, in brief, it may be stated that the Convention establishes the procedure which should be followed on sea and land frontiers with regard to the importation of cholera, plague, yellow fever, small-pox, and typhus. The International Health Office in Paris will act as a clearing house of information as regards these diseases. A Conference was also held with regard to the prevalence of epidemic diseases in the islands in the Pacific, and a unanimous report contains recommendations as to the methods to be employed in supplying information as to the incidence and spread of those diseases in those areas.

Variety of Interests.

Instances may be given of the great variety of important subjects which come within the scope of the Ministry's activities. The Ministry have taken an active part in connexion with committees which have sat during the year under review with regard to certain comparative aspects of child welfare, cancer, malaria, and vaccine lymph. Inquiries were also made into the sanitary conditions in representative areas of Northern Europe by 16 port medical officers of various nations, in which four English ports were included. Reference is made in the report to the recommendations of the Royal Commission on lunacy and mental disorder which was presented to Parliament last year. This report is still under the consideration of the Ministry. There were 57,313 nurses registered under the Nurses Registration Act (9 and 10 Geo. V. c. 94). In connexion with this it may be of interest to note that during the year in question 1392 nurses trained in Poor-law institutions sat for the preliminary examination of the General Nursing Council, of whom 1058 passed; and 1082 sat for the final, of whom 758 passed. The report remarks that the important contribution made by the Poor-law service to the recruitment of the nursing profession has been secured for the future by the recognition of many Poor-law infirmaries by the General Nursing Council as training schools for general nursing.

[1] London: H.M. Stationery Office, or through any Bookseller, 1927. 5s.

Notifiable Diseases.

From the table of the principal notifiable diseases it appears that there were 51,069 cases of diphtheria (including membranous croup), which was about 2500 over that for the previous year. There was a very marked decrease in the numbers of scarlet fever cases, the numbers being 81,672 as against 91,362 for the previous year, but small-pox cases increased by nearly 5000, but of which only 11 were fatal. The chief centre of infection from small-pox was in the County of Durham, which had 6645 cases. The report states that—

"the efforts of the local authorities and of their officers to combat the disease have been hindered by the indifference with which the disease is regarded by many persons, and by the consequent neglect of vaccination and of the most rudimentary precautions in the invaded areas . . . . It has been amply established that vaccination and revaccination afford a sure protection against this mild type of small-pox as well as against the more virulent type. On reference to the detailed figures in the report of the chief medical officer for 1926, it is shown that during the year no vaccinated person under the age of 13 years contracted the disease, and there was no instance of a person attacked by small-pox who had been vaccinated during the past eight years."

During the year 1925 only 44·2 per cent. of the children born were vaccinated. Although there was a large increase in the cases of small-pox during that particular year, yet the number of children vaccinated was lower than in the two previous years, when the number of small-pox cases was also lower. From the report it does not seem that local authorities coöperate as they might in cases of epidemics of small-pox. In one district there were some small-pox hospitals very much overcrowded, whilst other small-pox hospitals had vacant accommodation. To cope with this situation the Minister issued regulations under the Public Health (Prevention and Treatment of Disease) Act, 1913, by which regulations the county council concerned were enabled to coördinate the hospital resources of the county. A circular letter was addressed by the Minister to boards of guardians, drawing their attention to the need for strict compliance with the regulations, to prevent unrecognised cases of small-pox entering institutions and so spread infection.

Tuberculosis.

With regard to tuberculosis, the number of beds in residential institutions approved by the Minister has increased during the period under review by 779, the total being 22,202, of which 14,165 were provided by local authorities. The number of areas which contain out-patient clinics for tuberculous and other cripples is at present very few, but the Minister states that there is increasing evidence that—

"the local authorities generally realise the importance of making arrangements which will provide for the in-patient treatment of cripples at a properly equipped orthopædic hospital, and for their care and after-treatment at clinics established in connexion with the hospital and supervised by its medical staff."

Local authorities were advised by the Ministry that pretuberculous children should be dealt with by the local education authority in open-air schools and not in sanatoria. The report adds that Mr. Spahlinger's method of treatment for tuberculosis cannot be properly investigated here under present conditions. Inquiries with regard to Prof. Calmette's methods of inoculation are still proceeding, but it must be some years before a definite opinion can be expressed as to its efficacy. Tests are being made in Scotland of the method of treating this disease devised by the late Prof. Ruppel, but up to the date of the report the results of the tests were not known. The number of cases on the Register of Infections kept by medical officers of health was 358,133, of whom 165,987 were females. The number of deaths from tuberculosis has dropped from 54,295 in 1915 to 37,525 in 1926. The number of deaths from pulmonary tuberculosis has decreased more than 25 per cent. during the past 12 years and the deaths from non-pulmonary

tuberculosis have decreased by 45 per cent. during the same period.

Medical Benefit under the National Insurance Acts.

The total cost of medical benefit to the insured population was approximately £7,857,000, of which about £5,887,000 was paid to practitioners in respect of treatment, the balance being allocated to drugs and appliances. £200,000 was distributed to rural practitioners for mileage payments. (The insured population of England entitled to medical benefit was about 13,200,000.) £1000 was deducted from the remuneration of 77 medical men in 1926 as against £1549 to 105 practitioners in 1925, which, in turn, was a decrease of £504 and 29 respectively during the year 1924. Of the 77 cases above referred to only 16 cases were dealt with which involved allegations of failure or refusal to visit, unsatisfactory treatment, &c., and the department rightly says that this indicates that a high standard of treatment has been secured. Of the remaining 61 cases, 15 were in respect of irregular certification, 5 cases of fee charging, and 21 of failure to keep proper records. The highest amount withheld was £60 which was for failure to keep proper medical records. The other sums varied from £2 2*s.* to £50. There were 314,710 persons referred to the regional medical officers for report, this representing an increase of 70 per cent. on the figures for 1925. Of this number over 75,000 "declared off" the funds prior to examination and nearly 63,000 failed to attend. Of the remaining number (about 175,000), 30 per cent. were found to be incapable of work.

New M.O.H.'s.

During the year 70 new appointments of medical officers of health were sanctioned by the Minister. In 30 cases the officer appointed will devote his whole time to the duties, and by the end of the year 349 (out of 1231) medical officers of health in England were full-time officers.

MEDICINE AND THE LAW.

Doctors' Accounts: Liability to Render Details.

THE county court judge at Newcastle is reported to have stated in a recent case that a doctor's patients are entitled to detailed accounts and that in this respect a doctor is in no better position than any tradesman. This is no doubt the strict law, but the learned judge's dictum need not be interpreted as meaning that a medical practitioner must in future render all his accounts with the detailed itemisation of a grocer's bill. The contract between practitioner and patient is that the patient will pay the reasonable charges for services rendered. Naturally the patient, if he desires to go into details, is entitled to know what are the services for which charge is made and what is the charge for each service, so that he may form his own conclusion whether the charges are reasonable or not, and may contest them if he considers them excessive. The remarkable feature of the contractual relations between the medical profession and its patients is that, although the services rendered are often difficult to assess in pounds, shillings, and pence, there is rarely any agreement in advance as to the exact amount to be charged and yet there is seldom any challenge by the patient of the doctor's bill which, perhaps, does not reach him till long after the services have been rendered. The practitioner must always be prepared to justify his charges by furnishing details, but the patient will probably appreciate the fact that a lump sum account is often a smaller amount than the total of a catalogue of particular items from which no detail is omitted.

Alleged Food Poisoning in Restaurant.

The recent action of Richards *v.* Appenrodt Ltd., tried before Mr. Justice Horridge and a special jury, was a claim by a plaintiff described as a beauty specialist for damages for personal injuries alleged to be caused by food poisoning due to her having eaten a liver sausage sandwich at a Piccadilly restaurant belonging to the defendant company. As is usual in these cases, the plaintiff's counsel was obliged to admit the impossibility of direct proof that the poisoning was due to any particular portion of food; the court was asked to infer from the evidence that the particular food caused the poisoning. Medical evidence was called in support of this inference, though it was admitted in cross examination that all the symptoms might not have been caused by food poisoning and that the period of incubation of bacilli varied from a few hours to four days, so that it was conceivable that the poisoning might have developed as a result of food eaten earlier. The manager of the defendant company said that on the average 20 lb. to 30 lb. of sausages were delivered every morning at these premises. Most of this material would be sold the same day. If any remained unsold, it was placed in an ice-safe downstairs if the weather was unfavourable; if the weather was dry, it was left on dishes in the shop. It was also stated that any sausage sandwiches remaining over at the end of the day were given away, and that the company had a contract with a firm of insect killers for keeping the premises free of vermin, a representative of this firm visiting the premises once a week. The sanitary inspector for the borough of Holborn and the manufacturer who supplied the sausages gave evidence that the place of manufacture was perfectly clean. The jury found for the defendant company.

Euthanasia.

Mr. Justice Branson, at the recent Chester Assizes, used some remarkable words in drawing the attention of the grand jury to the case of a father who, according to the depositions, had taken the life of his little daughter to put an end to her sufferings from an incurable disease. "It is a matter which gives food for thought when one comes to consider that, had this poor child been an animal instead of a human being, so far from there being anything blameworthy in the man's action in putting an end to its suffering, he would actually have been liable to punishment if he had not done so." The facts of the case were of that pathetic kind to which many medical practitioners could find parallels in their own experience. The man's wife died early this year, suffering from tuberculosis and curvature of the spine. She left five children. One of these—a little girl 4 years of age—also contracted tuberculosis and, early in June, developed gangrene in the face after an attack of measles. The father nursed the child with devoted care. The doctor was of opinion that she could not live long. One morning last July, after sitting up all night with the child, the father went to his mother-in-law's house and told her he had drowned the little girl, as he could not bear to see her suffering any more. He then surrendered to the police, informing them that he had put the girl in a bath where the police found her lying face downwards in nine inches of water. Medical witnesses said that the child's death was expected from the nature of her disease, and that she was in such a state that shock would have caused death if an attempt had been made to move her to hospital. The doctor, replying to counsel for the defence, conceded that it was conceivable that the child could have died from shock consequent on her being lifted out of her cot. Perhaps on the basis of this answer the jury mercifully found itself able to return a verdict of "Not guilty."

A WARWICKSHIRE CONVALESCENT HOSPITAL.—Keresley Hall, a "black and white" house a few miles from Coventry, has been bought, with 10 acres, by the Coventry and Warwickshire Hospital as a clearing-house for convalescents.

MANCHESTER AND SALFORD MEDICAL CHARITIES FUND.—At the annual meting of this Fund it was stated that for the year ending June 30th last the ordinary income had amounted to £33,055, as compared with £22,254 in 1926. From the Alexandra Day effort £3870 had been received, whilst the university students on Shrove Tuesday had collected £12,061. The expenses of the fund amounted to about 6 per cent. of the receipts.

Public Health Services.

WOMEN AND PUBLIC HEALTH APPOINTMENTS.

THE Medical Women's Federation, having noted that a large proportion of the underpaid public health appointments advertiscd by local authorities are being accepted by women, has issued the following advice :—

Women who may be tempted to accept these black-listed appointments are asked to remember the following facts :—

1. That the whole position of women in the medical profession depends on their complete loyalty to professional standards of conduct and policy. They would never have been admitted to professional organisations nor accepted as colleagues in any sense if it had been anticipated that they would attempt to undercut their male competitors. Nothing is more calculated to introduce an element of discord into the relations of men and women in the profession than a spread of this practice.

2. That the salaries offered would be far lower than they are now but for the determined stand made in pre-war days. The present position is not a new one. Medical women ever since their admission to the profession have had to make precisely the same sacrifices for principle as are now demanded. With the inauguration of the School Medical Service in 1908, and later when maternity and child welfare posts were created, persistent efforts were made by local authorities to pay their assistant medical officers below the British Medical Association minimum, and to secure women at a lower rate than men. With rare exceptions the efforts were a failure, and "black-legging" was so uncommon that until the close of the war, comparatively few authorities wasted time in advertising posts below the agreed minimum.

3. That the salary scale fixed by the British Medical Association and the Society of Medical Officers of Health is none too high in relation to the enormous expense of medical education and the heavy cost of maintaining a household. Young men and women with few responsibilities should do nothing to make life impossible for the many of both sexes who have heavier obligations.

4. *That lowered pay invariably implies lowered status and prestige.* Holders of appointments which have been banned invariably find themselves cut off from professional advancement and stultified in all their work. The woman who stamps herself as belonging to an inferior grade of doctor cannot complain if she is taken at her own valuation.

5. That in regard to salaries, the minimum always tends to become a maximum, and once the agreed scale is abandoned and the professional ranks are broken, the lowest salaries will tend to be adopted by other authorities making new appointments. Authorities wishing to be economical would proceed still further, and the scale all over the country would be rapidly depressed.

6. That attempts to evade the scale and split the ranks of the profession by offering a man's post at the agreed rate and a woman's at slightly below are particularly to be deprecated. Where the rule of "equal pay for equal work" is violated, there is no limit to the extent to which women will be exploited and sweated. Medical women in the public health service have often been faced with the danger of a rise for male employees only, which could only be resisted by appealing to an inviolable rule.

7. That a woman who has betrayed her professional brethren, past, present, and to come, cannot expect the support of her colleagues or of professional organisations at any time in her career.

The leaflet is being distributed to all newly qualified medical women and to applicants for underpaid posts.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED OCT. 22ND, 1927.

Notifications.—The following cases of infectious disease were notified during the week :—Small-pox, 200 (last week 124) ; scarlet fever, 2450 ; diphtheria, 1438 ; enteric fever, 71 ; pneumonia, 975 ; puerperal fever, 37 ; puerperal pyrexia, 93 ; cerebro-spinal fever, 6 ; acute poliomyelitis, 30 ; acute polio-encephalitis, 3 ; encephalitis lethargica, 30 ; dysentery, 12 ; ophthalmia neonatorum, 128. There was no case of cholera, plague, or typhus fever notified during the week.

Of the 200 cases of small-pox, 14 were reported from the county of Derby (Alfreton 10, Ripley 3, Belper 1), 45 from Durham (Gateshead and South Shields 11 each, the remainder scattered over many urban and rural districts), 7 from Gloucester (Bristol 6, Warmley R.D. 1), 1 from Lancaster (Preston R.D.), 4 from Northumberland, 8 from Nottingham (1 from the county borough, the others scattered over the county), 5 from Warwick (Coventry R.D.), 8 from Yorks, North Riding (Middlesbrough 7, Eston 1), 34 from Yorks, West Riding (Doncaster 2, Leeds 6, Sheffield 3, the others from nine districts), 5 from Brecknock (Brynmawr), 24 from Glamorgan (Aberdare 10, Gelligaer 3, Mountain Ash 2, Pontypridd 9), 45 from Monmouth (34 of these from Ebbw Vale).

*Deaths.**—In the aggregate of great towns, including London, there was no death from small-pox, 3 (0) from enteric fever, 20 (1) from measles, 2 (0) from scarlet fever, 10 (0) from whooping-cough, 39 (8) from diphtheria, 65 (13) from diarrhœa and enteritis under two years, and 63 (15) from influenza. The figures in parentheses are those for London itself. The number of stillbirths registered during the week was 260 in the great towns, including 45 in London.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following are some 1926 statistics of eight London boroughs in different parts of the metropolitan area :—

Name of district and estimated mid-year population.	Birth-rate.	Death-rates per 1000 of the population.					Death-rates per 1000 births.		
		All causes.	Tuberculosis.	Cancer.	Respiratory diseases with influenza.	Heart disease.	Diarrhœa, &c., under 2 years.	Infant mortality.	Maternal mortality from childbirth.
Kensington .. (180,000)	15·1	12·8	0·89	1·91	2·4	2·1	13·6	60	3·3
St. Marylebone .. (105,800)	12·7	12·8	1·03	1·60	3·0	1·3	11·8	82	8·8
Hampstead .. (87,530)	12·3	10·6	0·64	1·54	1·6	1·6	5·5	60	2·8
Hackney .. (228,500)	17·2	10·8	0·88	1·41	2·1	1·4	17·0	59	4·8
Holborn .. (43,200)	12·4	12·1	0·81	1·46	2·7	1·3	22·4	90	3·7
Poplar .. (169,000)	21·6	11·4	0·96	1·27	2·5	1·3	17·2	70	3·5
Battersea .. (171,900)	17·3	11·4	0·96	1·53	1·8	2·0	9·4	62	3·4
Deptford .. (115,700)	18·2	11·3	0·90	1·37	1·9	1·6	9·0	56	4·7

The neonatal mortality-rates show a wide variation—viz., Kensington 18, St. Marylebone 28, Hampstead 33, Hackney 20, Holborn 41, Poplar 25, Battersea 27, and Deptford 23.

Kensington.

Dr. James Fenton points out that one of the satisfactory features in the drop of the infant mortality-rate from 78 in 1925 to 60 in 1926 is the decline in the number of deaths in the first month of life, the neonatal mortality-rate being only 18. He attributes this result to the concentration of effort on antenatal work in recent years. Antenatal work is now conducted at nine centres, including the clinic at the Queen Charlotte's Hospital Nurses' Home. More than 50 per cent of the working class mothers receive antenatal advice. During the last five years there has been only one maternal death following confinement amongst the women who have attended antenatal clinics in the borough during pregnancy, whereas there have been 57 deaths amongst those women who have not attended antenatal clinics. The borough has a good midwifery service. The council has a maternity home with ten beds and the guardians also have a ten-bed ward for confinements. The Queen Charlotte's nurses' home through its staff conducted 822 Kensington confinements. The antenatal work of this home is conducted by the medical staff of the hospital. The council maternity home was opened in 1924 in the grounds of St. Mary Abbot's Hospital, and the council pay to the guardians 5*s.* per day for each maternity case admitted, and

* See also p 1002.

the cost of additional nursing if required. During 1926 the council paid £853 in respect of 123 confinements and recovered £336 by patients' payments. For dealing with puerperal pyrexia, Dr. Remington Hobbs, medical superintendent of St. Mary Abbot's Hospital, has been appointed to act as consultant to the medical practitioners in Kensington, and arrangements have been made for the admission of cases of puerperal pyrexia into his hospital. Of 11 notified pyrexia cases 9 were removed to hospital and the only one who developed puerperal fever made a good recovery.

During the year a conference was held with various interested organisations to consider steps for reducing the damage done by rheumatic fever. As a result a scheme was formulated for the notification of rheumatic children under 16 years of age and for the establishment of a supervisory clinic, and this scheme has now become an accomplished fact.

The council has installed apparatus for the constant aeration and filtration of the water in all the four swimming-baths. The plant selected was that of the Pulsometer Engineering Co. and the results have been very satisfactory. A scheme for the prevention and early treatment of zymotic enteritis has now been in operation for three years under the superintendence of Dr. Ronald Carter. Full particulars are given and the results are claimed to be very effective. The nursing staff at St. Mary Abbot's Hospital are being immunised against diphtheria and the tuberculosis wards at this hospital are now linked up with the council's dispensary scheme. Dr. Fenton gives an encouraging account of housing conditions. The condition of the 2091 mews dwellings has been much improved. "Furnished houses," the most undesirable form of housing, have been gradually reduced from 187 in 1912 to 53 in 1926. For the purpose of the new by-laws the definition of "houses let-in-lodgings" has been altered by the exclusion of houses in which the tenant lives and in which not more than two additional persons or one family lodge. The difficulty in finding housing accommodation is becoming less and it is now possible to deal more actively with cases of overcrowding discovered.

St. Marylebone.

Dr. Chas. Porter cites as one of the chief events of the year the "representation" to the appropriate authorities that the Carlisle-street area must be regarded as an unhealthy one. The area covers about 16 acres and includes 533 premises and an approximate population of 5000. Negotiations with regard to the improvement scheme are in progress with the Ministry and the London County Council. There are about 300 premises in which meals are provided or food is sold ready cooked or is prepared for sale. On more than one occasion the St. Marylebone Council has pressed the Ministry and the London County Council to institute legislation for the registration of such premises, but no action has yet been taken by either of the authorities mentioned. Sterilised milk is permitted to be sold in unopened bottles without registration. Two vendors were successfully prosecuted during the year for selling this milk other than in the unopened bottle. The public analyst, Mr. J. F. F. Rowland, draws attention to the need for a cream standard. The ordinary cream samples examined during 1926 had an average fat percentage of 54·7, while the average fat in the tinned cream samples was only 28·87. Some of the tinned creams, he says, can only be truthfully termed enriched milks.

Hampstead.

Dr. Frank E. Scrase reports that it is the duty of the health visitors to inquire into and report upon all maternal deaths, stillbirths, deaths of children under 2 years of age, and cases of puerperal sepsis, and that a special subcommittee, including the three medical members of the health committee, Councillor T. Hancock Nunn, and Dr. Mary B. Douie (coöpted) has been appointed to go into the details of each case reported upon. During 1926 this subcommittee investigated 75 infant deaths, 39 stillbirths, 3 maternal deaths, and 10 cases of puerperal fever and pyrexia. Amongst other results it was found that 20 of the 39 stillbirths were due to difficulties in labour and were cases in which the services of the consulting obstetricians provided by the council might have been advantageously utilised. The facilities required, under the new regulations for puerperal pyrexia, have already been in operation for some time in Hampstead. Arrangements are also in force with the two nursing associations by which skilled maternity nursing can be obtained for any case in the borough. At the end of the year a scheme for the provision of artificial light treatment for children attending the centres began to operate. The antenatal clinics in Hampstead have always been municipal undertakings. During 1926, 308 expectant mothers attended, the total births in the borough being 1077. The public analyst, Mr. H. E. Cox, draws attention to the fact that soft cheeses prepared from milk are not infrequently sold as cream cheeses. He also presses for a standard for cream. Of four samples of ice-cream examined, two were merely frozen custard powder.

Hackney.

Dr. G. H. Dart gives the particulars of the first year's work of the municipal centre in Lower Clapton-road, which includes antenatal, child welfare, light, and dental clinics. Dr. Dorothy Gere successfully treated 190 cases at the light clinic, the length of treatment varying from four weeks in skin diseases to nine months in rickets. "Dramatic results" were obtained in impetigo and some cases of eczema and acne. Dr. Gere also claims to have obtained good results from the use of radiated dried milk in rickets, marasmus, and other conditions. The council have appointed Lady Barrett to act as consultant in accordance with the puerperal pyrexia regulations, and have made arrangements with the Camberwell research laboratories for the bacteriological work required. Skilled nursing and hospital treatment were already available. The number of expectant mothers attending the four antenatal centres was 980, the total births being 3949. "The River Lea has remained, during the past year, in the usual offensive condition." Severe floodings occurred in Hackney as the result of a storm on Sept. 1st, but the London County Council are said to be contemplating improvements to their sewerage system which will prevent future floodings.

Holborn.

Dr. C. W. Hutt says that the scavenging arrangements have been improved by the introduction of motor vehicles. The collection of house refuse in the main streets is now completed by 9 A.M., and most of the large old ashpits have been replaced by bins. The removal is done by a contractor. The refuse is first removed to the contractor's depôt at Vauxhall, where it is sorted and the useful portion salved. The remainder is removed to dumps on brickfields at Sittingbourne, where some of it is used for brick-making. The nearest house is one mile away from the dumps and no nuisance is said to be created. The Holborn Council are taking part in an investigation into the composition of house and trade refuse in the metropolitan area, instigated by the Ministry of Health. Five-ton samples of refuse have been taken at different seasons and from different classes of property, and the samples divided according to the fineness of the ashes and the other material such as vegetable matter, paper, metal, rags, glass, and bone, all weighed up and classified. Systematic efforts for the suppression of rats have been maintained throughout the year. Dr. Hutt reports adversely with regard to the proposals in the Factories' Bill of 1926. He contends that the proposal to transfer sanitary control of factories to the Home Office is undesirable, and that dual control, extra expenditure, and no greater efficiency would be the result. The Holborn Council have passed a resolution disapproving of the new proposals.

Out of 25 samples of milk examined three were found to contain tubercle bacilli. But little satisfaction resulted from following up the cases, as the modern practice of mixing milk at large creameries

rendered it impossible to say from which farm the infected milk came. Efforts are being made to improve the conditions under which ice-cream is made in the "Italian colony" of Holborn.

The immunisation of children against diphtheria is being prosecuted energetically in Holborn. During the last five years about 1000 children have been Schick tested, of whom 752 were positive. Five hundred and ninety-one have been immunised, and the reaction after the injection of the toxin antitoxin and toxoid antitoxin has been in practically every case negligible. Dr. Hutt urges the importance of having the immunisation carried out as soon after the age of 6 months as possible, as more than half the deaths from diphtheria in London occur before the school age.

Poplar.

Dr. Frederick W. Alexander, in his thirty-fourth and final report, wishes the borough "may have the highest birth-rate and the lowest death-rate in the kingdom and an infantile mortality so negligible that there will be no necessity in future for a heading in future annual reports." A new and commodious welfare clinic was opened in North Poplar in January at a cost of about £3000. The maternity beds provided by the guardians are insufficient to meet the needs, and the establishment of a new joint maternity home by the council and guardians is under consideration. An additional health visitor has been appointed. The maternity and child welfare work is divided between the council and the Royal College of St. Katharine. Dr. E. M. Layman reports good results at the two municipal artificial light clinics. Illustrative charts are given and a full description of the technique employed. The report as to the results obtained at the light clinic of St. Katharine's is not so enthusiastic. Dr. A. G. Hamilton, who is in charge, finds that he obtains better results in the summer by exposing children to direct sunlight out of doors. He pictures the artificial sunlight room of the future as "a large, well-ventilated, well-warmed room, flooded with light from multiple sources, where the children can play in safety with nothing but their eyes shielded from the rays. The present method of short exposures, with children sitting or lying inert, has its obvious disadvantages." Prints of the plans of the observation wards, under construction at Wellington-road, are included in the report. The building contains on the ground floor two five-cot wards and an isolation ward, accommodation for a dental clinic, light clinic, milk laboratory, and a flat roof for open-air treatment, with the necessary accommodation for the nursing and domestic staff.

There were 43 notifications of ophthalmia neonatorum; the last case of impaired vision from this cause occurred in 1922. The visiting of cases of zymotic enteritis is most unsatisfactory owing to the uncertainty of the notifications. In 15 cases death occurred before the notification was received. The council resolved to supply Grade A (T.T.) milk for their free milk scheme from Jan. 1st, but in September it was reported that 15 out of 43 samples of this designated milk had proved unsatisfactory, and it was proposed to discontinue its use. Ultimately it was decided to reconsider the matter in April, 1927. The chief difficulties of the tuberculosis scheme are the shortage of adequate housing accommodation and the almost complete lack of work for tuberculous patients capable of being employed under special conditions.

Rebuilding is now proceeding in two unhealthy areas, in one case by the Poplar Council and in the other by the County Council. Four samples of margarine were found to be adulterated with mineral oil, varying in amount from 10 to 15 per cent. The analyst, Mr. A. E. Parkes, reports that many vendors sell as "pure cocoa" a compound containing added alkali. He thinks that such cocoa powder should have some special designation.

Battersea.

Dr. G. Quin Lennane says the outstanding feature of the year's work has been the development of antenatal work in connexion with the midwifery services. There are five municipal infant welfare centres and three voluntary ones. The antenatal cases are referred from the voluntary centres to the municipal, except in the case of one, which has a fortnightly antenatal clinic. The antenatal work is under the careful direction of Dr. Alice Bloomfield. The central clinic is at the borough maternity hospital and there are three branch clinics. The total patients attending numbered 1208. The births in the borough were 2969. It is an inflexible rule that every expectant mother, who applies for admission to the maternity hospital or for the services of the district midwife, should attend one of the antenatal clinics. The maternity hospital, with accommodation for 30 patients, admitted 625 cases, 14 of which came in for antenatal treatment. Of the cases confined 570 were delivered by midwives and 41 by doctors. In ten of the cases the consultant obstetrician, Dr. J. S. Fairbairn, was called in. Dr. Bloomfield reports that the cases attend at an earlier stage of pregnancy than heretofore. Thus 453 attended before the sixth month, 356 between the sixth and eighth months, and only 74 after the eighth month. Out of 906 new patients, only five cases of breech presentation escaped diagnosis; 17 breech cases were admitted to the hospital for external version under anæsthesia, and in seven of these version was successful, while in the remaining ten labour resulted in a living child in all but one case. A special V.D. clinic is held at the maternity hospital. Of the patients tested, 3·5 per cent. had a positive Wassermann in 1924, 2·1 per cent. in 1925, and 1·5 per cent. in 1926, the numbers tested in these years being 517, 653, and 658 respectively. Of the ten who gave a positive reaction in 1926, nine treated at the antenatal clinic had healthy babies. Six of these babies had a negative Wassermann and the other three had not been brought up for testing at the end of the year. The previous results of the pregnancies of these nine women are interesting. Thus 25 pregnancies resulted in 7 miscarriages, 2 stillbirths, 5 children who are already dead, and only 11 now living. Complete arrangements have been made to meet the puerperal fever regulations, and Mr. A. H. Richardson, of St. Thomas's Hospital, has been appointed consultant.

Considerable progress has been made with the Plough-road area improvement scheme, and photographs are given of the houses prior to demolition and the new tenements which have replaced them. The serious overcrowding in some of the wards has not been to any adequate extent abated owing to the lack of housing accommodation at low rentals.

Deptford.

Dr. Charles S. Thomson explains in popular language the rationale of diphtheria immunisation schemes. He shows how unsatisfactorily notification of pneumonia is working. There were 185 notifications and 108 deaths. He is not sanguine that the services of the consultant will be much utilised in the case of puerperal fever. He puts forward as some of the pressing needs of Deptford: a mothers' home for difficult breast-feeding cases; a hostel for babies when the mothers are forced to go into hospital; toddlers' playgrounds, as in Edinburgh; and a development of the educational side of the maternity and child welfare centres with sewing classes, lectures, and so on. New cases attending the antenatal clinics numbered 499 and the births in the year 2108. A great deal of attention has been given to the conditions under which people work in the workshops and factories in the borough, and a number of improvements have been inaugurated as the result of the visits paid. It reads as somewhat anomalous that previous to the inspections no washing facilities were provided at the soap works. There appears to be little prospect of any tangible amelioration of the widespread overcrowding. Some applicants have been fortunate in obtaining London County Council houses at Downham or Becontree, but the main desideratum is housing accommodation near at hand at an economic rent. The "representation" made in 1920 involved some 24 streets and 811 houses but

no action has yet been taken. A beginning has, however, been made with the Watergate-street area. The tuberculosis care committee has done useful work; a few children from infected homes have been boarded out under the London County Council scheme. At the light clinic, which is held in the basement of the Town Hall until the new Deptford health centre is built in Harton-street, there were 185 patients under treatment at the end of the year.

The Services.

INTERNATIONAL CONGRESS OF AIR NAVIGATION.

AT the recent Air Congress in Rome, presided over by Principe Amedeo Di Savoia-Aosta, the medical section was chiefly concerned in confirming the ordinary routine of its reports. Air Vice-marshall Munro was, unfortunately, unable to be present, but the proceedings were purely formal, the rapporteur, Signor Garsaux, reading out a subcommission's recommendations. Those of the most practical interest concerned some relaxation in the standards of fitness for pilots who had given previous proof of flying ability, while alterations were suggested in the period after which they had to come up for re-examination.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdrs.: H. W. Fitzroy-Williams to *Egmont*; P. M. Rivaz to *Barham*; and W. H. Edgar to *Vivid*, for *Rodney* (on commg.).

Surg. Lts.: S. G. Weldon to *Revenge*, on transfer; J. L. Malone to *Nelson*, on transfer; V. G. Horan to *Vivid*, for *Rodney* (on commg.); G. Rorison to *Barham*; and J. J. Keevil to *Warspite* (both on transfer).

ROYAL ARMY MEDICAL CORPS.

Maj. R. G. S. Gregg retires on ret. pay, and is granted the rank of Lt.-Col.

Maj. J. M. Pinkerton to be Temp. Capt., and temporarily relinquishes the rank of Maj.

Capt. D. J. MacDougall to be Maj. (Prov.).

S. M. Burrows to be Temp. Lt.

Lt. (on prob.) P. G. Bentlif, from the secd. list, is restd. to the estabt.

Temp. Lt. J. W. Dowzer relinquishes his commn.

ARMY DENTAL CORPS.

Capt, A. B. Austin to be Maj.

Capt. O. G. E. Simpson retires, receiving a gratuity.

ARMY RESERVE OF OFFICERS.

Maj.-Gen. J. J. Gerrard, late R.A.M.C., having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

ROYAL AIR FORCE.

Flying Officers G. M. Anderson and B. L. Edwards are promoted to Flight Lts.

INDIAN MEDICAL SERVICE.

Lt.-Cols. J. D. Graham and M. MacKelvie to be Cols.

Capt. Sukumar Nag to be Maj.

Officers relinquishing their temp. commns.: Temp. Capt. Kongattil Madhava Menon and Temp. Lt. J. T. Fernandez.

Lt.-Col. E. F. Harvey retires.

Maj. J. A. Shorten has been appointed Professor of Physiology, Medical College, Calcutta. Maj. W. C. Paton has been appointed to act as District Medical Officer, Malabar District, and Superintendent, Headquarter Hospital and Mental Hospital, Calicut, vice Lt.-Col. A. P. G. Lorimer, granted leave. Dr. Baldhadra Singh, Civil Surgeon, has been posted to Mirzapur. Capt. S. D. Gupta to be Second-in-Command, Indian Military Hospital, Nowshera, vice Capt. W. D. B. Read, vacated. Maj. R. F. Barnsley to be Officer Commanding British Military Hospital, Gharial, vice Maj. E. V. Whitby. Maj. C. Wilson to officiate as Officer Commanding British Military Hospital, Peshawar, vice Lt.-Col. P. C. Douglass, appointed officiating A.D.M.S., Peshawar District. Maj. K. K. Chatterjee, Additional Surgeon, Out-patient Department, Medical College, Calcutta, to be Honorary Assistant Surgeon, vice Rai Upendra Nath Brahmachara Bahadur, retired. Lt.-Col. W. J. Powell, Inspector-General of Prisons and Officiating Director of Public Health, Central Provinces, has been appointed Civil Surgeon, Pachmarhi. Maj. R. N. Kpadia to officiate as Officer Commanding, Combined Indian Military Hospital, Kohat. Dr. Lhawja Moinuddin, Director, Educational and Sanitation Department, Dr. Hurdiker, Dr. Sureti, and Dr. Clarke have been appointed delegates to attend the Seventh Congress of Tropical Medicine to be held at Calcutta in December.

Correspondence.

"Audi alteram partem."

ALKALI TREATMENT OF SCARLET FEVER.

To the Editor of THE LANCET.

SIR,—I was interested in Dr. E. H. J. Berry's article on this subject in THE LANCET of Oct. 22nd. As prominence has been given to this method of treatment lately some results I obtained four years ago may be of interest.

Dr. Berry assumes the toxic origin of scarlatinal nephritis and he has found that the administration of alkalis neutralises the effects of this toxin. He does not, however, indicate what he considers the nature of the toxin to be or the modus operandi of the alkalis. The toxic theory is generally accepted, but scarlatinal nephritis has also been attributed to the direct action of germs themselves and streptococci have been found to be present in the kidneys post mortem. Now it is well known that in cases of *B. coli* cystitis, where infection has occurred from below, a condition frequently met with in cases of puerperal infection, that the rapid change of the reaction of the urine from acid to alkali then back again to acid and so on, by the alternate administration of large dose of alkali and acid by the mouth, the condition is quickly cured. In these cases the vitality of the organisms is apparently damaged by the rapid changing of the pH of the medium in which they are existing—viz., the urine—and are rapidly destroyed. This supposition is further supported by the fact that the treatment is only satisfactory if undertaken in the very early stages of the infection.

With such cases and the possibility that scarlatinal nephritis might be caused by the action of micro-organisms on the kidney in mind, I thought that if such were the case and if this treatment could be applied to scarlatinal nephritis the same results might be obtained. Two conditions would require to be fulfilled, the case would have to be treated early, and it would have to be possible to change the pH of the blood rapidly. Nephritis is, nowadays, a comparatively rare complication of scarlet fever; I was, however, able to obtain eight cases in a fairly short time. They were all hospital patients where the urine was tested every 12 hours, so treatment could be started within a few hours of the onset of symptoms. Without making any comment on the classification of nephritis I omitted the late albuminurias and only selected those cases which were frankly acute with a febrile reaction, diminished secretion of urine, albumin, blood and casts, no cases of the type showing œdema as the first symptom presented themselves.

In each case the urine at the onset was acid to litmus. Under these circumstances my practice was, in cases over 5 years of age, and only one was under this, to give sodii bicarb. in doses of 60 gr. every four hours for four doses or less if the urine became alkaline before; it was usually alkaline after the third dose. The reaction of the urine was noted each time it was passed and if scanty or difficult to obtain the patient was catheterised. In one patient under 4 years of age the dose was sodii bicarb. 30 gr. four-hourly; the urine became alkaline after the fourth dose. When the urine was definitely alkaline to litmus the patient was left for 24–36 hours, and if the urine was not then acid, acid sodii phosph. was given, when definitely acid alkalis were again administered, this time in smaller doses, until the urine became either alkaline or amphoteric; the treatment was then stopped.

The following notes briefly indicate the results I obtained:—

In four cases the temperature was normal and the urine normal in quantity and perfectly free from albumin and blood on the fourth day after treatment was started. In one case the above results were obtained on the fifth day. In one case the temperature rapidly subsided and the blood cleared, but there was a faint trace of albumin until the

eighth day. In one case a very faint trace of albumin remained for three weeks, and one case did not respond at all. This patient was a boy aged 12 years, who had a history of kidney trouble and œdema several years before. Two of the patients developed rashes during the alkali treatment, one a blotchy erythema and one an urticarial eruption.

I am in no way pressing the theory of direct bacterial action as the cause of scarlatinal nephritis. I mentioned the matter in order to indicate the train of thought that prompted me to try the treatment. I have no experimental evidence to offer in support of such theory. I was unable at the time to make any laboratory investigations apart from microscopical examination of the urine, consequently I have no evidence that the change in the pH of the blood was of sufficient degree or took place sufficiently rapidly to damage the vitality of any organism even had such been acting locally, as in the cases of cystitis. It was my intention to make further observations, but unfortunately during the last three years no opportunity has presented itself.

Dr. Berry is rather dogmatic in his conclusions, for it must be remembered that 70–80 per cent. of scarlet fever patients will recover without any serious complication provided that they are suitably dieted and proper attention is paid to the condition of the throat. The statement "It seems obvious that alkalis should be given all the time the patient is considered infectious" appears to me to be somewhat exaggerated. Assuming a toxic cause for nephritis, then in five of my acute cases all that was necessary was the administration of 190–240 gr. of sodii bicarb. within a period of 12 hours to neutralise the toxic effects, for as soon as the urine was alkaline to litmus I allowed it to become acid again, and during this period there was no exacerbation of symptoms. Continuous administration does not appear to have been indicated in these cases; again, in some of Dr. Berry's own cases complications apparently occurred while the urine was actually alkaline.

There seems to be room for further investigations along such lines as: Assuming there is a scarlatinal toxin, in what way do alkalies render it inert? What are the indications for the administration of alkalis? Which is the best preparation to use and what is the optimum dosage? Work along these lines would probably yield better results than the substitution of one empirical method for another.

I am, Sir, yours faithfully,
H. J. PHILLIPS, M.D., B.Sc.

Oldham, Oct. 24th, 1927.

To the Editor of THE LANCET.

SIR,—The beneficial effects from the use of large doses of alkali in the treatment of scarlet fever, recorded by Dr. Berry, prompts me to write this note. I have for some time past been watching my cases, from the point of view of acidæmia and alkalæmia, and find the investigation most helpful. The former condition I have referred to in former publications [1]; the latter I am at present investigating, and find it not infrequent (including the alkalosis that is already recognised as being present in acute high intestinal obstruction).[2]

The importance of the hydrogen-ion concentration of the blood in its relation to disease was brought home to me by a paper by Ellice Macdonald, of Philadelphia, on Chemical Aspects of Life and Disease,[3] in which he points out that not only can the acid or alkali state of the blood by itself cause ill-health, but that they can predispose to certain illnesses—the type of which varies with the underlying blood state. To put it shortly, he has shown by X ray meals of the gastro-intestinal tract (postural tone) that the smooth muscle reaction, as he calls it, varies according as the blood swings to the acid or alkaline sides. In the former (acid) type the vagus autonomic system is in preponderance; in the latter (alkaline) the sympathetic is in predominance. Amongst the acid type he groups most infections; of which scarlet fever with its great tendency to acidosis, as pointed out by Dr. Berry, is one. Here, therefore, we find a rational explanation of the reason why alkalies are so beneficial—viz., that the blood state which predisposed patients to scarlet fever was already an acid condition of the system, with vagus preponderance, and that this acid state was increased by the scarlet fever organism. The use of the alkaline salts of potassium in these cases may not be without significance, as in another paper Macdonald [4] shows that potassium chloride is a stimulant to the sympathetic nervous system. This view of disease seems to me to promise a fruitful line for investigation.

I am, Sir, yours faithfully,
Darlington, Oct. 24th, 1927. R. CHALMERS.

[1] Accidental Hæmorrhage and Placental Infarction, R. Chalmers, Brit. Med. Jour., 1926, i., 807.
[2] Alkalosis: Treatment by Ammonium Chloride per Rectum and Concentrated Intravenous Saline, R. Chalmers, THE LANCET, 1926, ii., 1267.
[3] Chemical Aspects of Life and Disease, Ellice Macdonald, N.Y. Medical Record, Oct. 20th, 1926.
[4] Chemical Aspects of Life and Disease (continued)," Ibid., July 7th, 1926.

SOME CASES OF ERYTHEMA NODOSUM.

To the Editor of THE LANCET.

SIR,—The occurrence of three cases of erythema nodosum in my practice early this year induced me some months ago to collect all the cases I had seen since 1918, and I was therefore particularly interested in Dr. Mitman's excellent account of a small outbreak of this malady and the lucid review of the situation in THE LANCET of Oct. 8th (pp. 751 and 761). I had come to the conclusion that erythema nodosum was a manifestation of what I am in the habit of calling by the handy name of "tonsillar influenza"—a type of tonsillitis which occurs during "influenza" epidemics. Since August, 1925, this type of influenza has been endemic in my practice (and I believe all over the country), and five out of the eight cases described below have been seen since April, 1926. Other interesting complications of this type of tonsillitis have been pulmonary infarction, "nephritis," "pyelitis," "hæmaturia," and unilateral effusion of the knee (non-rheumatic). I find that the occurrence of erythema nodosum coincides with the other complications, and whenever I see a case of the former I am on the look-out for cases of the latter.

The following are the histories of the eight cases; I refer to the pulmonary and renal cases seen about the same times.

(1) F., 18. Seen 8/5/20. Diagnosis: erythema nodosum. I only questioned the patient as to whether she had had rheumatism, and not realising the importance of tonsillitis I do not remember if the patient had had a sore-throat. My books show that tonsillitis was very prevalent at the time. I saw a case of pulmonary infarction following tonsillitis on May 8th and a case of puerperal cerebral embolism on May 12th.

(2) F., 27. Seen 1/11/20. Labelled "tonsillitis and erythema nodosum." Tonsillitis prevalent. No renal or pulmonary infarcts until following month.

(3) F., 20. Seen 13/2/25. Influenza epidemic. Labelled "erythema nodosum following sore-throat." Case of pyelitis on Feb. 9th, and two cases of pulmonary infarction on Feb. 24th and several in ensuing weeks.

(4) F., 29. Seen 31/3/26. Influenza prevalent. She had influenza and sore-throat. Later, jaundice was followed by severe pains in the legs and erythema nodosum was marked on April 12th. I had an epidemic of post-influenzal nephritis in March, saw a case of "hæmorrhagic nephritis" on April 5th, cases of pulmonary infarction on March 30th and April 8th (both following tonsillitis), and a post-operative pulmonary embolism on April 8th!

(5) M., 10. Seen 1/10/26. Tonsillitis. Oct. 5th: erythema nodosum. On Oct. 3rd I saw a case of pulmonary infarction and on Oct. 6th a case of renal infarction. Both were endocarditis patients suffering from influenza.

(6) F., 23. Seen 22/1/27. Influenza epidemic. Erythema nodosum and slight erysipelas of face following sore-throat. Case of influenzal nephritis on Jan. 26th, cases of pulmonary infarction (influenza and dilated hearts) on Jan. 18th and 31st, and a case of cerebral embolism (V.D.H.) on Jan. 23rd.

(7) F., 28. Seen 15/3/27. "Influenza cold." March 22nd: "neuritis in legs." March 24th: "erythema nodosum."

The temperature kept up for three weeks but no explanation of it was made. This patient two years previously had a suppurating cervical gland, presumably tuberculous.

(8) F., 34. Seen 16/4/27. Influenza. Said she spat up something like jam (? small infarct) on 18th. On April 26th there was an extensive eruption of erythema nodosum on the fronts of the legs and backs of the arms. This patient had an attack in 1920 (same as No. 2), so that second attacks do occur. On April 13th an endocarditis patient with influenza and tonsillitis (her healthy sister had the same complaint) had a renal infarction.

All the patients were healthy subjects except No. 7, and in none of them was there the slightest evidence of an attack of true rheumatism. Probably the old observers confused post-influenzal neuritis with acute rheumatism—a mistake which is not uncommon to-day.

It is curious that seven of the cases were females. It is also curious that not a single case was seen in the extensive epidemics of 1918, 1919, 1922, and 1924. Renal complications were also rare in these epidemics. It seems, therefore, that there must be a particular germ or group of germs which favour the occurrence of these complications.

Is it possible that the eruption in these cases is due to thrombosis or embolism in the cutaneous vessels? It sounds far-fetched that such should occur in an area of free anastomosis such as the skin. Yet the site of the eruption—the fronts of the legs—is generally reckoned an avascular region.

Apropos of Dr. Mitman's use of the term "pseudo-lobar" pneumonia, I am of the belief that these cases are very often not pneumonia at all but pulmonary infarctions which have been mistaken for pneumonia. Without the appearance of characteristic blood sputa the diagnosis is extremely difficult.

I am, Sir, yours faithfully,

AMBROSE W. OWEN,
Hon. Surgeon, Aberdare General Hospital.

Oct. 27th, 1927.

RADIOPACITY OF GLASS.

To the Editor of THE LANCET.

SIR,—I am at present engaged in determining the opacity of various substances to X rays. The results of my investigations are not yet ready for publication, but as Miss Mann in her article on the Treatment of Perforating Injuries of the Eye in THE LANCET of Oct. 29th, says, ". . . even lead glass fragments may be localised, but the lighter forms of glass are transparent to the rays," I thought the following might be of interest.

I obtained specimens of various glass, consisting of pieces from an old X ray plate, a bottle, a window, an electric light lamp, a test-tube, and a piece of corrugated roof glass. I arranged these on an X ray film and took a radiogram. I then buried them in the middle of a piece of raw beef 5 in. in thickness and made a second exposure. All the glasses cast shadows. The pieces from the electric light lamp and the test-tube (the thinnest glass I could obtain) cast faint but nevertheless unmistakable shadows, even when embedded in the beef. I obtained these shadows when I used either hard or soft rays, and I used the ordinary exposure that I would use in taking a radiogram of an arm.

On consulting a book on glass-making I learn that the ordinary flint crystal or table glass contains oxide of lead and bottle glass oxide of iron. X ray books as a whole are curiously reticent as to the radiopacity of glass, and those that do mention it make contradictory statements. Holmes and Ruggles in their book say that fragments of glass may be missed, even in the thin tissue of the finger, while Bythell and A. E. Barclay state "even ordinary flint glass throws a shadow sufficiently heavy to be visible on the plate, provided that it is embedded reasonably near the surface," but I can find no reference to the visualisation of a piece of glass 2½ in. from the surface.

I am, Sir, yours faithfully,

Dublin, Oct. 29th, 1927. SYLVIA B. WIGODER, M.D.

A CASE OF CEPHALIC TETANUS.

To the Editor of THE LANCET.

SIR,—Dr. Macneill Simpson takes me to task in your issue of Sept. 17th for exaggerating the rareness of cephalic tetanus by writing that "tetanus limited to the head and neck is very uncommon." Perhaps I have been misled by my own experience to think it more uncommon than it is, for the case described by Dr. J. P. Fitzpatrick and myself in THE LANCET of Sept. 10th is the only one of the kind which I have seen during 25 years' service in the Eastern tropics. Judging, however, from such records as I have read, it is rare for the spasms, in so severe a case, to be confined to the head and neck. In one of the four cases described by the late Sir George Humphrey, in the article cited by Dr. Simpson, there were frequent severe spasms of the body muscles; in another, there was opisthotonos; and, in the two remaining cases, the abdominal muscles were involved.

In our case there was, unfortunately, but little to be hoped from treatment; the patient could not swallow, and, as Sir George Humphrey wrote in Allbutt and Rolleston's "System of Medicine," when food cannot be swallowed recovery rarely takes place, and nothing can be relied upon even to postpone the fatal event." Tetanus antitoxin was given from the day of the patient's admission to hospital, though little benefit could be expected from it; for, as far as could be made out from the somewhat vague history, the first symptoms had appeared about a week before. Rectal injections were returned at once unless the patient was kept under an anæsthetic. The wound was healed and no local interference was indicated. Apart from the administration of antitoxin, treatment was limited to attempts to get fluids and carbohydrates into the patient, and to alleviating his sufferings with sedatives and anæsthetics.

There was no asphyxia or indication for the tracheotomy which gave relief in one of Sir George Humphrey's cases.—I am, Sir, yours faithfully,

WILLIAM FLETCHER.

Kenilworth, Warwickshire, Oct. 27th, 1927.

RECTAL INJECTION OF VOMITED BILE.

To the Editor of THE LANCET.

SIR,—In THE LANCET of August 13th last, Mr. R. St. Leger Brockman brought forward evidence to show that the toxæmia and vomiting which accompany intestinal obstruction were mitigated by rectal injection of human bile diluted with saline. A proportion of cases of gastro-enterostomy vomit bile after operation. Usually this ceases within 48 hours, but the longer it lasts the more anxiety it causes. To return this bile mixed with rectal saline is at once so simple, convenient, and harmless, that if it is not to become an immediate routine procedure, it certainly warrants an extended trial. Personally, I have been favourably impressed by the method, and believe it will reduce the number of cases requiring gastric lavage. I am, Sir, yours faithfully,

Birmingham, Oct. 29th, 1927. HAMILTON BAILEY.

DIABETES WITH RENAL GLYCOSURIA.

To the Editor of THE LANCET.

SIR,—Abnormal permeability of the kidneys for glucose is not very uncommon in diabetes, and, as Dr. Voigt (THE LANCET, Oct. 29th, p. 916) has found, its presence complicates the insulin treatment. As a rule, the lowering of the renal threshold, in my experience, is associated with, and appears to be dependent upon, a low calcium content of the blood; for when the calcium is raised to the normal level by treatment glycosuria does not occur unless hyperglycæmia is present. The defect of calcium metabolism responsible for the condition probably arises from disturbances in the functions of the parathyroids

caused by chronic toxæmia, most likely in Dr. Voigt's case of intestinal origin, hence the administration of parathyroid with calcium salts and removal of the cause of the toxæmia bring about more permanent improvement than calcium salts given alone, as I pointed out some years ago ("New Views on Diabetes," 1923, p. 392).

The failing sight, mentioned in Dr. Voigt's case, is interesting; I have noticed that disturbances of vision are more liable to occur in diabetics with a low percentage of calcium in their blood than in others, and that measures which increase the calcium frequently give better results than simple treatment of the defect of carbohydrate metabolism.

I am, Sir, yours faithfully,

P. J. CAMMIDGE.

Nottingham-place, Marylebone, W., Oct. 29th, 1927.

PAYMENT TO HOSPITALS FOR MOTOR ACCIDENTS.

To the Editor of THE LANCET.

SIR,—I regret that Dr. Fothergill, whose letter appears in your issue of Oct. 29th, has been misled by some loose wording in a printed report. Of course he is right—the only contracts are as between the insurance company and the patient on the one hand and the practitioner and the patient on the other. I never said that the practitioner could send his bill to the insurance company. But what we do hope is that, by using the machinery of the paying ward, a bill can be sent in which will eventually take its place among the other expenses forming the basis of the victim's claim upon his insurance company.

As a matter of common practice, based entirely upon convenience, a practitioner's bill may occasionally be sent direct to an insurance company, but nobody ought to suppose that this recognises any contract between these parties. So much of what insurance companies pay out is based upon claims which would not be legally binding were the matter brought into court. Nor do we imagine that the companies will treat the paying ward of a hospital less generously than they are in the habit of treating doctors in such cases, once the position is established of these wards being entitled to make contracts with patients which are not possible on the part of a voluntary hospital under ordinary conditions.

Obviously the matter is of growing importance to all hospitals, and it is essential that the legal position should not be misunderstood from the start.

I am, Sir, yours faithfully,

PHILIP T. CARILL-WORSLEY,
Vice-Chairman,
Norfolk and Norwich Hospital.

Oct. 29th, 1927.

MISLEADING QUALIFICATIONS.

To the Editor of THE LANCET.

SIR,—In the course of his reply to critics, "Ethics" states: "In the surgical world the English Fellowship is recognised to be the highest surgical distinction," and adduces as evidence for this statement, "it is a compulsory passport to admission to honorary surgical appointments in all teaching English hospitals," adding "many Edinburgh and Irish Fellows endeavour to obtain it after acquiring their own." As a matter of fact, in Scotland and Ireland the Scottish and Irish Fellowships are compulsory passports for similar posts. Is it to be inferred that Scottish and Irish hospitals are not equal to those of England, or their staffs not as efficient? Many Fellows of all the Colleges take the M.D. and M.R.C.P. not as higher distinctions but as additional qualifications.

As to the F.R.C.S. Edin. not being a purely surgical distinction, I do not agree with "Ethics." A candidate for the Edinburgh Fellowship has to pass a special examination in surgery, plus a special examination in the subject he professes, and if he intends to practise operative surgery he has to operate on the dead body. Surely this is sound. An English Fellow may practise gynæcology or dentistry without having been tested in these subjects in his Fellowship examination. In this respect I consider the Edinburgh Fellowship is in advance of the English. True there is no "primary" in the Edinburgh diploma; but the English "primary" is not surgery, and the intending Edinburgh Fellow has to satisfy the examiners as to his knowledge of anatomy—no easy matter.

Surely it is really a matter of custom and possibly—I have not verified the fact—the English College may be senior. F.R.C.S. stands for Fellow of the Royal College of Surgeons without specifying which. Those of us who hold the Fellowship of Edinburgh and add Ed. do so because we are proud of it and do not wish any mistake made. Let the F.R.C.S. England add Eng. and all will be well.

I am, Sir, yours faithfully,

F.R.C.S. EDINBURGH.

Oct. 29th, 1927.

*** We have received other letters in reply to "Ethics." The writer of one of the most vigorous of these holds the Double Fellowship, but has omitted to enclose his card.—ED. L.

REGISTRATION OF NURSING HOMES.

To the Editor of THE LANCET.

SIR,—We feel that the public (your readers) are not sufficiently aware of the dangerous provisions that have been inserted in the "Nursing Homes (Registration) Bill." These place the duty of inspecting nursing and maternity homes in the hands of the smaller local authorities (in many cases the rural or district councils), and propose the repeal of Part 2 of the Midwives and Maternity Homes Act, 1926. This Act, which has been working satisfactorily since passed, placed the inspection of maternity homes under the same authority as the midwives, the county councils, and the county borough councils. If the new Bill, as amended, is passed, the result will be—dual inspection, the home being under one authority and the midwives working in it under another, with conflicting rules and regulations; the possibility, so undesirable in administrative work, of the influence of personal friends and vested interests; and the certainty that the smaller authorities would not be able to provide well trained, whole-time inspectors with expert knowledge.

I am, Sir, yours faithfully,

L. RAMSDEN,
President, Midwives' Institute.

12, Buckingham-street, W.C., Oct. 31st, 1927.

ROYAL MEDICAL BENEVOLENT FUND.

AT the last meeting of the Case Committee 50 cases were considered and £648 was voted to 44 applicants. Below is a summary of some of the cases relieved.

Widow, aged 67, of M.D. who died in 1894. Only income 10s. a week from Government for son killed in the war. Son, aged 35, lives at home and the responsibility of the home falls on him; at the present time he is only earning £2 a week after being out of work for some time. Applicant has had many money losses and, as she has to keep her daughter at home to look after herself and the cottage, asks the Fund for help. Rent of the cottage, 10s. a week. Voted £24 in quarterly instalments.

Widow, aged 47, of M.R.C.S. who died last month. Late husband was in receipt of a grant from this Fund of £40, £20 of which had been paid. Applicant asks that the balance may be transferred to her. The Committee acceded to her request.

Daughter, aged 52, of M.R.C.S. who died in 1907. On the death of her father took a boarding-house which she was obliged to sell up in 1925 owing to ill-health. On regaining her health took up domestic work, and in June this year took another house in which she has let unfurnished rooms; she retains two for herself to carry on a sewing business. Voted £25 to meet rates and to buy some furniture for her room.

Widow, aged 59, of L.S.A. who died in 1914. Left with five daughters, two of whom are black-and-white artists, one a nursery governess, and the two youngest modellers. Owing to trade depression she has not been able to meet rates, and £20 was voted to meet these and other debts.

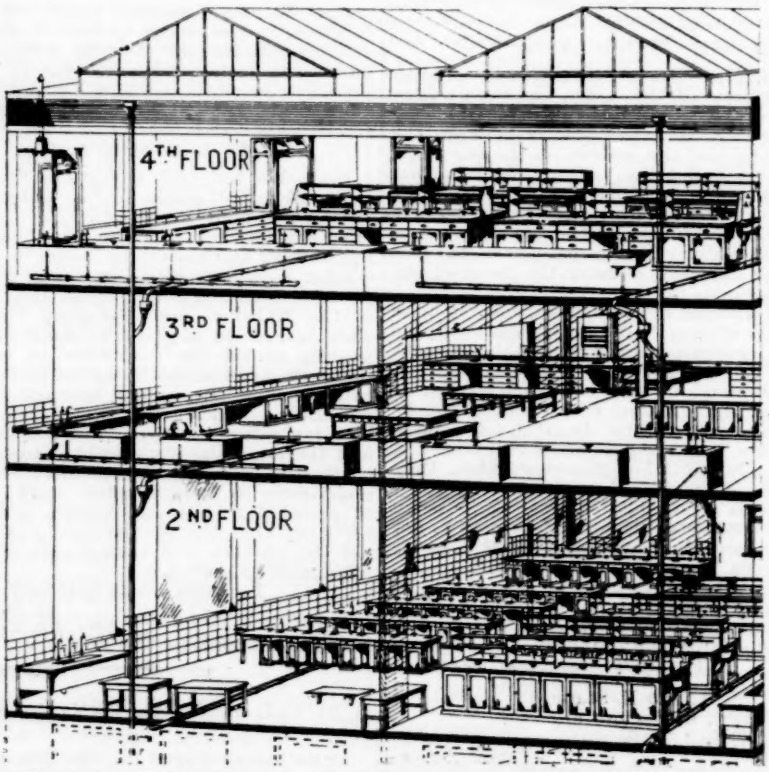
Subscriptions may be sent to the hon. treasurer, Sir Charters Symonds, at 11, Chandos-street, Cavendish-square, London, W. 1.

WELSH NATIONAL SCHOOL OF MEDICINE:

NEW MEDICAL UNIT LABORATORIES.

THE new laboratories of the medical unit of the Welsh National School of Medicine have just been completed at the Cardiff Royal Infirmary. They have been erected on the site of the old casualty department of the hospital, which opened out of the south side of the main hospital corridor between the entrance block and the Insole ward block. The cost of the building and part of the equipment have been provided through the generosity of the Rockefeller Foundation, New York.

The laboratory block consists of ground, first, second, third, and fourth floors; an internal staircase in the new block, on the side adjoining the hospital wards of the unit, gives access from floor to floor. Owing to the difference in levels of the new floors from those of the hospital, the five storeys of the laboratory block occupy the same height as the four main hospital storeys; there is intercommunication between the new staircase landings and the hospital corridors on the ground, first, second, and third floors of the hospital. There are, in addition, external iron escape ladders on the north side of the laboratory block from the fourth floor to the third floor roof below, from which the hospital second floor corridor may be reached through a window; and from the second floor to the roof over the main hospital corridor on the ground floor below. Thus, in the event of a fire filling the new staircase with smoke, there is an alternative route to the ground from every floor.



The Medical Unit Laboratories, Welsh National School of Medicine. Showing in detail the lay-out of the three upper floors.

The new block is lighted from the south on the ground floor, and from the north, south, and west on all the upper floors; and in addition the second and fourth floors have skylights, so that every laboratory and room has ample illumination.

Externally, the walls are faced with Cattybrook bricks from Bristol, similar to those used throughout the hospital. The stone sills, strings, and copings are Forest of Dean stone. All floors are of the "Kleine" fire-resisting reinforced terra-cotta construction, as are also the roofs. The stairs are of patent stone, with carborundum treads. Internally, the floors are covered with teak blocks on the ground floor and with cork parquet on all the other floors except in the lavatories and store cupboards off the stair landings, where they are of patent stone. The walls have tiled dadoes on the staircase and on all floors except the first, where the staff rooms are situated. Above the tiled dadoes the walls are finished in Keene's cement and distempered.

All floors are heated by hot-water radiators connected to a new calorifier installed in the old basement beneath this block. This calorifier is heated by steam taken from the main boilers of the hospital. In addition, the staff rooms on the first floor have gas fires. All the laboratory benches are of oak with teak tops, fitted with gas and electric plugs, and water, and the whole building is lighted by electricity. Separate electric and gas mains supply this block, and the water-supply comes through a separate meter.

General Arrangement of the Laboratories.

The general arrangement of the laboratories is as follows.

On the ground floor folding teak doors open from the main hospital corridors into a small lobby from which the staircase rises to the upper floors. The ground floor contains two research laboratories fitted up for experimental work and a photographic dark room. One laboratory is 27 ft. by 21 ft. 6 in. and the other 21 ft. by 20 ft. Both are 12 ft. high. In the partition wall between the two there is a wide roller shutter which can be raised or lowered at will so as to convert the two laboratories more or less into one if required. Ample electric power and light plugs are provided in the ceiling and on the walls, and gas, electric plugs, and water taps are fixed on the benches along the windows. Large sinks with hot and cold water are also fitted separately from the benches. A three-way cable and telephone communicating with the medical unit wards are fitted for electrocardiographic work, and a floor plug with lead to earth is fixed.

On the *first floor* are the staff rooms and office, all 8 ft. 6 in. high. The professor's room is 21 ft. 6 in. by 21 ft.; the other rooms are 21 ft. 6 in. by 15 ft., 21 ft. by 15 ft., and 17 ft. by 16 ft. 6 in. The professor's room is in telephonic communication with all the floors, and an outside telephone as well as an intercommunicating departmental telephone is installed in a telephone box in the office. On the landing of this floor are a lavatory and three store rooms.

On the *second floor* are the two teaching laboratories for students. One, the clinical pathology and bacteriology laboratory, measures 37 ft. by 21 ft. 9 in. high, and is lighted on the north, south, and west sides. Bench accommodation for 30 students is provided. The benches face north, and a skylight

running along this aspect of the laboratory over the windows, gives additional lighting. Behind the students' benches there is a free floor space of 21 ft. 9 in. by 13 ft. 7 in. Benches for sterilisers, centrifuges, shakers, &c., are provided and large washing-up sinks fitted.

The other laboratory on this floor is the students' laboratory for biochemistry. It measures 37 ft. by 21 ft. by 12 ft. high, and is lighted on the north and south by the ordinary windows, but there is also a skylight running along the north side of the laboratory. Four large double chemical benches are fitted, providing accommodation for 32 students if required; large washing-up sinks, fume cupboards, balance benches—specially lit—benches for centrifuges, shakers, &c., and a draught cupboard for stills, muffle-furnaces, &c., are fixed in different parts of the laboratory. A polarimeter room, lavatory, and store rooms are located on the staircase landing of this floor.

The *third floor*, which is 9 ft. high, contains research laboratories for clinical pathology and bacteriology, and serological work. The former measures 28 ft. by 22 ft. and is lighted on the north, south, and west walls; in addition to fitted benches all round, two movable tables are provided and electric light and power plugs are fixed over them. The serological laboratory measures 17 ft. 8 in. by 14 ft. 6 in. and is lighted on the south wall. A bench with thick vitriolite top is fixed along the south wall and benches for baths, &c., are also provided. A media-preparation and sterilising room, 21 ft. by 13 ft. 6 in., is also included in this floor. Opening off the adjoining landing are a hot (incubator) room, 9 ft. 4 in. by 7 ft., electrically heated, and a store room for refrigerator and large centrifuge. There is also a lavatory on this landing.

The *fourth floor* consists of one large biochemical research laboratory measuring 43 ft. 6 in. by 28 ft. 6 in. It is lighted on the north, south, and west sides and has two large skylights. Four large double research chemical benches are fitted each 12 ft. by 4 ft. 6 in. by 3 ft. high—and in addition there is another chemical bench running along the south side of the laboratory. Balance benches, specially illuminated, are fitted along the north wall, and six fume cupboards, one partially enclosed draught cupboard, and benches for electric shakers, stirrers, centrifuges, &c., are provided.

A special feature of the laboratory block is its close proximity to the medical unit wards. A doorway from the internal staircase of the laboratory opens on to the top floor corridor of the hospital and is within 12 yards of the medical unit wards.

The architect, Mr. E. Stanley Hall, F.R.I.B.A., of the firm of Edwin T. and E. Stanley Hall, London, evidently gave effect, with close attention to detail, to the wishes of Prof. A. Mills Kennedy, the director of the medical unit, and both deserve congratulations on the result of their labours.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Local Appointments.

IT is satisfactory to note that the outcry against the new method of appointing the officers of local authorities is receiving no sympathy from responsible Ministers. Replying to a question in the Dail last week President Cosgrave took the opportunity of defending the procedure followed by the Appointments Commissioners. He said that it had not been the practice of the Local Appointments Commissioners to furnish a list of the qualifications of unsuccessful candidates for vacant posts. In settling their practice the objects of the Commissioners were primarily to secure the election of the best qualified candidate, and incidentally to relieve members of local authorities from the embarrassment caused in the past by attempts on the part of candidates to advance their candidature through the exercise of local influence. The submission of the names of all qualified candidates was not calculated to achieve these objects, and if any name other than that of the best qualified applicant were submitted it would be very difficult, if not impossible, to justify the exclusion from the list of any qualified candidate. Furthermore, if the names of the qualified candidates were forwarded in their order of merit those candidates who had failed to obtain a high place might with reason be apprehensive lest the publication of such a list would adversely affect their professional prospects.

In a letter to the daily papers, published on Oct. 31st, Dr. T. Hennessy analyses the qualifications of three candidates recently appointed to dispensaries in the county of Dublin. These appointments had been the mark of severe—and, as Dr. Hennessy shows—unwarranted criticism by one of the local authorities concerned. These candidates all had good records, as he showed, but the nature of the criticism made it clear that none of them would have had any chance of election under the old system unless, in addition to his professional qualifications, he had possessed local or family influence with the members of the local authority. A system which makes it possible for such candidates to obtain appointment on their merits alone is a great reform in administration.

THE NEW R.A.F. HOSPITAL.

EQUIPMENT AT HALTON.

ON Monday last the Royal Air Force's hospital and nursing sisters' quarters at Halton, near Wendover, were formally opened by Princess Mary Viscountess Lascelles.

The new building, which will be called Princess Mary's Royal Air Force Hospital, is built in two storeys of pleasant-coloured red brick. It is sheltered from the north and east by a ridge of the Chilterns and overlooks a beautiful valley. Its position as well as its construction ensure that ventilation—the first need of a hospital after shelter—shall be adequate. At present there is accommodation for about 200 beds, but there is room for expansion. The general design may be seen in the plan which we reproduce below. There are a medical and an acute medical ward, a surgical and an acute surgical ward, a mental ward, two wards for apprentices, a section for officers (some small rooms, a ward for a dozen patients, a dining room, a library, and a billiard room), a section for women and children, and a labour ward.

The ward units are good. On one side of the entrance is the sister's room with an ice-chest, the scullery with a gas oven and rings, and a store; on the other side is a special ward with one or two beds, a recess with a steam steriliser for instruments, a recreation room, and annexes with three water-closets (elbow rests to each), a lavatory and a bath, also a room for bedpans with a large slab for scrubbing mackintoshes. All the taps are white; there is little or nothing to polish. The ward itself has 23 beds, painted buff with a slightly darker dado toning with the rubber carpet on the floor, and a dull red surround to meet the rounded edge of the walls. Windows alternate with the beds; each is iron-framed, in three sections and pivoted horizontally, so that ventilation is easy. The window-sill is of white enamelled rounded bricks, and below each is a sufficient radiator, so that draughts are not felt. These radiators are the principal source of heat, but there are also two coal fires (whose smoke escapes through floor ducts) to add to the patients' comfort in cold and stormy weather. Green curtains shade the windows. Lighting is central, by eight large lights over the foot of the beds, but there are also movable lamps at the bed-heads. Each bed has a chair, and a bed-table with two shelves, and a rail at the back for the damp towel. The children's ward has a frieze

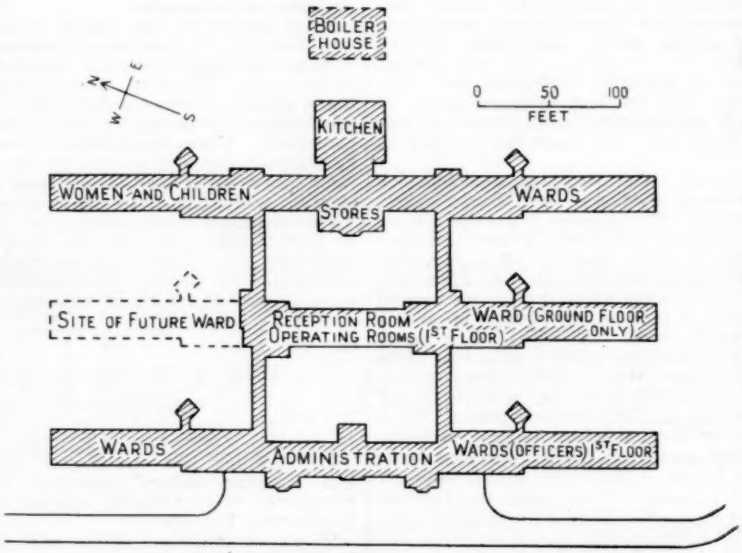
of grotesque animals—rather a breakaway from Government tradition.

The mental ward has been well planned. A spring bolt on the door of the padded room holds the door as soon as it is shut, and if the orderly cannot see all he wants through the window, he may slip on a strong chain and open the door without fear that the patient will push past him. Here is the detention ward which will be little used, for it is found that prisoners, if put on their honour not to give trouble, can as a rule be safely trusted in the ordinary wards.

Two large dining rooms are provided for convalescents; one of them is also a recreation room and has a piano, a gift from the sergeants' messes of connected stations, and the nucleus of a hospital library. There are two boilers; one heats the radiators, the other provides steam for cooking, sterilising, and heating water for the lavatories. Vegetables and puddings are cooked by steam, roasting and grilling is done by gas, and there is also a coal range. Vegetables are prepared for cooking outside the kitchen, across a yard, so as to keep dirt off the premises. At the hospital end of the kitchen is a large hot-plate, and beyond that a counter where the wards receive their diets in highly polished, covered boxes; in the wards the food is divided to the patients by the sisters. An ice-store below the dispensary is connected by a lift with the floors above. Passages throughout the hospital are covered with corticine, which makes for comfort and quiet; corners are everywhere rounded and there are few dust-traps. People always kick a swing door open. Here a rubber patch is provided for them to kick.

The reception room at the main door has lavatory accommodation opening off it on one side, whilst on the other are the medical officer's rooms, one of which is fitted out for making examinations. In another part of the building are quarters for the orderly medical officer, and the commanding officer and his registrar. The staff have good offices and there are eight medical officers. The orderlies are well lodged, their rooms have fireplaces, and corticine on the floors. There are steel lockers for their clothes, and in suite with each room are w.c.'s, upright slab urinals, washing basins, and douche and slipper baths. The orderlies' kitchen and dining room are in another building. The sergeants have a very comfortable mess, whose rooms can be thrown into one for dances. The married quarters of the station are all around the hospital. They are cleverly planned so that rooms on the border between houses can be assigned to either as the families require.

Accessory services are the powerful X ray plant with its photographic rooms, the hospital clinical laboratory (the Central Air Force laboratory is close by, but independent), the electrical, massage, and gymnastic appliance rooms, and the ophthalmic room. The septic and aseptic operating-theatres on the first floor are painted in green. The north wall of the aseptic theatre is almost all glass, most of it a single huge sheet affording a beautiful light. Over the table is a new shadowless lamp. The lighting of the theatre is double, and the constant glow of a small red lamp shows that the emergency circuit is ever available. The floor is terrazzo, very smooth and easy to clean, but with little strength in itself. Beside the theatre are rooms and a bath for surgeons, and the sisters have equal consideration. The new sisters' home consists of 38 rooms with a small hospital for the sick. These quarters are about 200 yards from the hospital, and there are rooms for their cloaks at each end of the building.



Plan of the R.A.F. Hospital at Halton.

In the isolation hospital are some half dozen observation rooms for two patients, each entered only from the open air, but in the walls are large glass panels permitting the sister when in one ward to keep an eye on the others. Separate from the main building is the venereal section 25 beds in a hut, very sparsely occupied, with the usual treatment rooms. Every endeavour is being made to get cases to report early so as to shorten the treatment.

The hospital has now been in use for nearly three weeks. Apart from the fact that the building has not been wired for wireless whilst being erected, which might have saved expense, it is difficult to find fault with the arrangements, for the planning has been most judicious. Nothing seems to have been wasted on ornament, but the appropriateness of everything makes the place very handsome.

We offer our thanks to Wing-Commander W. W. Shorten, who is in command, for the trouble he took to show and explain the hospital to our representative.

MEDICAL CONGRESS IN EGYPT.—A congress to be known as "Journées Médicales d'Egypte" is to held at Cairo from Dec. 15th to 24th. The voyage and conference will involve an absence of from 20 to 22 days from Marseilles. French, English, Arabic, German, and Italian will be the official languages used, and there will be an international exhibition of arts and sciences as applied to medicine, surgery, pharmacy, and sanitary hygiene. Further particulars may be obtained from Dr. Zeitoun, 32, Rue Gay-Lussac, Paris (Ve).

CANCER RESEARCH HOSPITALS.—The governors of Middlesex Hospital are appealing for the means of placing the old Cancer Charity, now renamed the Middlesex Cancer Hospital, on a self-supporting basis and, if possible, of extending its accommodation. The charity was founded 135 years ago. The governors feel that if cancer patients are to be induced to submit themselves to treatment in the early stages of the disease the accommodation must be increased.—At St. Mark's, City-road, E.C., the Lord Mayor of London last week opened a new wing. The extension includes two wards which will increase the in-patient accommodation by 18 beds, making a total of 72, an out-patients' department, and nurses' quarters. The cost has been £23,000, of which £3000 remains to be raised. It was stated that medical men from all parts of the world come of St. Mark's cancer research laboratories to study the methods to the hospital.

Medical News.

UNIVERSITY OF CAMBRIDGE.—At a Congregation on Oct. 28th the following degrees were conferred:—

M.D.—C. E. Newman.
M.B., B.Chir.—G. B. Woodd Walker and G. A. Q. Lennane.
B.Chir.—F. H. A. Walker.

ROYAL COLLEGE OF PHYSICIANS OF LONDON.—An ordinary quarterly comitia of the College was held on Oct. 27th, the President, Sir John Rose Bradford, being in the chair. The following candidates, having satisfied the Censors' Board, were admitted to the Membership:—

Drs. Ivan McDonald Allen, Doris Manning Baker, Donald Davidson, Henry Victor Dicks, Andraous Erian, Noel Trelawney Glynn, Wesley George Catchlove Godbehear, John Gerald Edward Hayden, Edward Humphry Vere Hodge, Eric Canton Seward, George Ernest Frederick Sutton, John Martin Twhigg, Lionel Ernest Howard Whitby, and Maurice Lindsay Young.

Licences to practise were conferred upon 175 candidates (153 men and 22 women) who have passed the final examination in medicine, surgery, and midwifery, and have complied with the by-laws of the College. The following are the names and medical schools of the successful candidates:—

Mary E. A. Allen, Birmingham; F. W. Allinson and S. W. Allinson, Univ. Coll.; J. V. Almeyda, Bombay and London; Joan Anderson, Manchester; B. J. E. Anson, King's Coll.; C. Arkles, Guy's; M. I. Ashmawi, Cairo and St. Thomas's; P. V. Bamford, Bengal and London; O. A. Beadle, Oxford and Guy's; W. J. H. M. Beattie, Cambridge and St. Bart.'s; C. A. Bence, Cardiff; F. W. Besley, Cambridge and London; H. R. P. Boucaut, Adelaide and London; A. R. Bowtell, Oxford and Univ. Coll.; W. V. Boyle, Cambridge and London; W. E. R. Branch, Univ. Coll.; D. H. Brinton, Oxford and St. Mary's; Ruth M. Brittan, Royal Free; L. Brown, Cape and Guy's; J. R. Buchanan, Univ. Coll.; E. S. Caley, St. Thomas's; C. S. Carter, St. Mary's; B. W. Cartwright, Birmingham; A. J. W. Chamings, Cambridge and St. George's; W. A. Clark, St. Bart.'s; E. Clayton-Jones, Cambridge and Guy's; Amy G. Clogg, Cambridge and King's Coll.; M. Coleman, Univ. Coll.; M. Coll, Durham; N. B. Colman, Witwatersrand and St. Bart.'s; A. W. Cubitt, Oxford and King's Coll.; E. G. C. Darke, St. Bart.'s; Ethel G. Davies, Cardiff and Royal Free; S. B. Davis, Oxford and London; R. de Sousa, Bombay and London; P. M. Deville, Guy's; W. E. Dornan, Leeds; C. H. Egan, South Africa and Guy's; Antoinette H. P. Ellis, Charing Cross; D. Ellis, Guy's; S. Farfel, Witwatersrand and St. Bart.'s; C. J. Farr, King's Coll.; H. G. Floyd, Guy's; Helen M. G. Foster, Univ. Coll.; J. L. Franklin, Cambridge and St. George's; L. W. Freeman, St. Mary's; C. R. E. Freezer, Guy's; T. O. Garland, Cambridge and Guy's; S. Gifford, St. Thomas's; Edith Giles, Charing Cross; G. G. Gillam, Univ. Coll.; Barbara M. L. Glover, Royal Free; P. S. Goonewardene, Ceylon and Middlesex; E. L. Graff, Cambridge and Guy's; A. W. T. Green, Middlesex; F. Grundy, Leeds; Brenda G. Hallett, Royal Free and St. Mary's; A. S. Hatch, Univ. Coll.; W. J. Heely, Guy's; R. A. Hill, St. Thomas's; L. T. Hilliard, Cambridge and St. George's; W. A. C. Horter, Middlesex; Esther M. Hoskin, King's College; G. McI. Housden, Guy's; Lilian J. Hubble, Royal Free and King's Coll.; E. C. H. Huddy, Guy's; E. H. Hudson, Cambridge and Guy's; W. F. Hudson, Guy's; T. I. Hughes, Bristol; F. H. Hunnard, Univ. Coll.; W. A. Hutton, St. Bart.'s; S. Inder Sen, Punjab and London; G. L. M. Inkster, Oxford and Middlesex; E. D. Irvine, Liverpool; E. T. James, Cambridge and St. Bart.'s; T. E. James, Cardiff; B. R. M. Johnson, Middlesex; R. E. Jones, Birmingham; D. F. Kanaar, Guy's; C. A. Keele, Middlesex; W. R. Keizer, London; Rachel I. Kessel, Charing Cross; H. A. Kidd, St. Mary's; K. Knowles, St. Bart.'s; E. Landau, Cambridge and St. George's; L. E. Lane, Cape and Guy's; I. W. Lazarus, London; J. T. Lewis, Cardiff; M. J. Liberson, Durham and Middlesex; A. W. Lilley, Manchester; Edith G. Limmex, King's Coll.; F. E. Lipscomb and D. H. Lloyd, Middlesex; J. Lloyd, Cardiff; A. Long, Leeds; P. H. Loretz and W. S. McConnell, Guy's; A. M. McMaster, St. Bart.'s; H. I. Maister, Guy's; H. E. Mansell, Oxford and St. George's; Beryl L. Mappin, St. Mary's; W. H. Miller, Guy's; W. Milligan, Leeds; D. P. Mitra, Harvard and Charing Cross; R. V. Mone, Bombay and St. Thomas's; A. M. A. Moore and P. H. L. Moore, London; D. T. R Morris, Univ. Coll.; T. C. Mort, Cardiff; T. Morton St. Thomas's; Gertrude M. Nicholson, Durham; W. A. Nicholson, Cambridge and St. Bart.'s; A. T. Pagan, St. Bart.'s; W. R. S. Panckridge, Middlesex; M. D. Patel, Bombay; M. N. Patel and A. Peacock, London; J. R. Peacock, Cambridge and St. George's; G. M. Phadke, Univ. Coll.; L. M. J. A. Pilot, St. George's; G. W. Pimblett and D. Preiskel, St. Bart.'s; W. J. E. Radford, Guy's; P. R. Rainey, St. Bart.'s; B. D. Rawlin, Sheffield; B. R. R. R. Reddy, Mysore and Durham; W. G. Rees, Oxford and King's Coll.; W. V. Roache, I. M. Robertson, and R. Roderick, St. Bart.'s; R. Rose, Middlesex; Mona M. Russell Cruise, Royal Free and St. Mary's; A. de la C. Russian and P. G. Salt, St. Bart.'s; J. I. Sapwell, Cambridge and King's Coll.; R. Saran, Calcutta and London; S. Scheinfein, Univ. Coll.; T. G. Scott, Guy's; H. Shenouda, Cairo and Manchester; V. C. Shroff, Bombay and Westminster; Catherine E. M. Siddall, Royal Free and St. Mary's; E. J. Silverman, Middlesex; T. E. N. Simpson, Liverpool; M. R. Sinclair, Cambridge and St. Bart.'s; E. T. O. Slater, Cambridge and St. George's; Felix Smith, Birmingham; Fred Smith, Cambridge and London; G. H. A. Soysa, Ceylon; E. T. C. Spooner, Cambridge and St. Bart.'s; Joan Staddon, King's Coll.; R. J. Steeds, Univ. Coll.; T. R. Stevens, St. Thomas's; D. W. Stuart, King's Coll.; J. H. R. Thomas, Cardiff; L. G. Thomas, Liverpool; Doris H. Tomes, Westminster; Sybil E. Tremellen, King's Coll.; S. L. Tunnicliffe, Liverpool; L. P. Tupling, Guy's; H. L. Vaidya, Bombay and London; Isabel Vallance, St. Mary's; J. H. Wainwright, Cambridge and Westminster; Nora W. Wamsley, Charing Cross; A. J. Watson, Middlesex; J. R. S. Webb, St. Thomas's; W. A. S. Welsh, Birmingham; A. R. N. Whitlow, Univ. Coll.; P. C. Wickremesinghe, Ceylon and Guy's; J. W. Wigg, Univ. Coll.; W. J. Wilkin, Cambridge and St. Bart.'s; G. H. J. Williams, Cardiff and London; S. T. Williamson, Guy's; W. A. Wood, St. Bart.'s; and E. C. Wynne-Edwards, St. Thomas's.

On the nomination of the Council, Dr. Robert Arthur Young, Dr. Joseph Shaw Bolton, Dr. Grafton Elliot Smith, and Sir Percy Bassett-Smith were elected Councillors to take the places of Dr. A. G. Phear, Sir StClair Thomson, Dr. Bedford Pierce, and Sir Leonard Rogers.—Sir Francis Champneys was re-elected a Representative of the College on the Central Midwives Board.—Dr. R. A. Young was reappointed a member of the Committee of Management.—The President announced the award of the Jenks memorial scholarship for 1927 to James Ramsay Muirhead Martin, formerly of Epsom College.—The President announced the appointment of Dr. A. G. Gibson to the Bradshaw lectureship for 1928, and of Dr. J. Graham Forbes to the Milroy lectureship for 1929.—The President announced the award of the Gilbert Blane gold medal to Commander A. W. McRorie, M.B., R.N.—The President announced that the adjudicators have awarded the Weber-Parkes prize to Dr. A. Stanley Griffith, of Cambridge.—Among others, communications were received from: (1) Dr. J. G. Taylor, of Chester, asking the College to accept his resignation of the Fellowship. This was accepted with regret. (2) The British Pathologists Association, asking the College to consider the desirability of instituting a special Diploma in Pathology. The President nominated a Committee to consider the question and to report to the College. (3) The War Office, inviting the College to send a representative on the Organising Committee of the International Congress of Military Medicine and Pharmacy to be held in London on May 6th to 11th, 1929. The President was appointed to represent the College. (4) Mr. F. G. Hallett, expressing his appreciation of the action of the College on his retirement from the office of Secretary to the Conjoint Board.—A report was received from the representative of the College on the Committee of Management of the Chelsea Physic Garden, and ordered to be entered on the minutes.—A report was received from the Committee of Management recommending that the Universities of Cologne and Barcelona, and the University of Tennessee College of Medicine be added to the list of institutions whose Graduates in Medicine are admissible to the Final Examination in Medicine, Surgery, and Midwifery. The Committee further reported that they had recognised courses of instruction at the following institutions—viz., D.P.H. Examination: the Haffkine Institute, Parel, Bombay; the London School of Hygiene and Tropical Medicine (the five months' course recognised for the course of parasitology only); and the University of Lucknow.—The Committee reported the retirement by rotation from the Committee of Dr. R. A. Young and Mr. F. J. Steward.—After some formal College business, the President dissolved the comitia.

GRESHAM COLLEGE.—Four lectures on Insanity and History of its Treatment will be delivered at 6 P.M. on Monday, Tuesday, Thursday, and Friday, Nov. 7th, 8th, 10th, and 11th, by Sir Robert Armstrong-Jones, at Gresham College, Basinghall-street, E.C. 2. Admission free.

OPTICAL SOCIETY.—The next meeting will be held at the Imperial College of Science on Thursday, Nov. 10th, at 7.30 P.M. Mr. J. R. Hamblin and Mr. T. H. Winsor will read a paper on the Resolution of Gratings by the Astigmatic Eye, and Mr. O. Aves a paper on the Deviograph and Trial Frame.

HARWICH FORCE DINING CLUB.—This Club was established in 1924 for the purpose of reuniting all commissioned officers who served as such at Harwich at any time during the war, 1914–18. A dinner is held once a year, and all officers of the R.N.R., R.N.V.R., as well as the Royal Navy and Marines are eligible for membership. The dinner this year is to be held at the Hotel Metropole on Friday, Dec. 16th. Any officers desiring to become members should communicate with Lieut.-Commander H. Trevor Dawson, R.N., 6, Broadway, Westminster, S.W. 1.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.—The annual dinner will be held on Thursday, Nov. 17th. The guests will include Mr. Neville Chamberlain (Minister of Health) and Lord Eustace Percy (President of the Board of Education).

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL.—On Friday, Nov. 11th, at 4 P.M., Mr. Ernest B. Waggett will deliver the annual address, entitled On Observation.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—A meeting of this society will be held at the Miller General Hospital, Greenwich, on Friday, Nov. 11th, at 8.45 P.M., when Dr. Edward Mapother will deliver an address on Coöperation by the Profession in the Treatment of Mental Disorder.

THE BRITISH SCIENCE GUILD.—The subject of the third annual Norman Lockyer lecture will be Scientific Ethics, and it will be given by Dean Inge on Monday, Nov. 21st, at 4 P.M., in the Goldsmiths' Hall, Foster-lane, London, E.C. Admission is free and tickets may be had from the Secretary of the Guild, 6, John-street, Adelphi, W.C. 2.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—On Monday, Nov. 7th, at 5 P.M., at the Medical Society, 11, Chandos-street, Cavendish-square, W., Sir StClair Thomson will deliver a lecture on Bleeding from the Nose and Throat. On Wednesday, Nov. 9th, at 12 noon, Mr. Greeves will give a special clinical demonstration at the Royal London Ophthalmic Hospital, and on the same day at 3 P.M. Sir William Willcox will give a special demonstration at St. Mary's Hospital. Mr. Cecil Rowntree will demonstrate on Thursday, Nov. 10th, at 3 P.M., at the Cancer Hospital. The lecture and demonstrations are open to members of the medical profession without fee. From Nov. 14th to 26th there will be a clinical course at St. Peter's Hospital, including a series of formal lectures on diseases of the urinary tract. From Nov. 14th to Dec. 3rd a course in surgery and gynæcology will be held at the Royal Waterloo Hospital, occupying the mornings and some afternoons. From Nov. 21st to Dec. 17th, at 5 P.M. daily, a series of clinical demonstrations upon selected cases will be given by the staff at the West End Hospital for Nervous Diseases, and from Nov. 21st, daily from 4.30 P.M. to 6 P.M., for two weeks, there will be a course for practitioners at the London Temperance Hospital. A course in proctology will be given at St. Mark's Hospital from Nov. 28th to Dec. 3rd. Copies of all syllabuses are obtainable from the Secretary of the Fellowship at 1, Wimpole-street, London, W. 1, and will be sent regularly to those who wish to receive them. Specimen copies of the *Post-Graduate Medical Journal* will be sent on request.

JOINT TUBERCULOSIS COUNCIL.—At a meeting of the Council held at 1, Upper Montagu-street, London, W.C., on Oct. 22nd, attention was called to the restriction placed on tuberculosis schemes by the 1912 Act which aimed at the treatment of patients rather than the prevention of disease. A resolution sent up by the Society of Medical Superintendents and the Tuberculosis Society to the following effect was endorsed:—

> This meeting desires to draw the attention of the Ministry of Health to the grave difficulties in carrying out the scheme of the departmental committee on tuberculosis owing to the restrictions placed on the treatment of debilitated children who may be suffering from tuberculosis, by the necessity of waiting for the notifiable stage to be reached before action can be taken under the present tuberculosis scheme.

The Council considered that if there was a reasonable probability of tuberculosis in childhood the lack of precision in diagnosis and the sequential absence of notification should not necessarily hinder treatment in a suitable institution.—Officers for 1928 were elected as follows: Sir Henry Gauvain, chairman, Dr. Lissant Cox, vice-chairman, Dr. James Watt, treasurer, and Dr. E. Ward, Secretary.

Post-graduate Course in Radiology.—The Council is arranging a post-graduate course on radiology in tuberculosis and diseases of the lungs, to be held at the City of London Hospital (Victoria Park, E.) from Monday, Nov. 21st, to Saturday, Nov. 26th. Each morning there will be demonstrations of radiograms or museum specimens by members of the hospital staff, with further lectures or demonstrations in the afternoon. The radiograms will be displayed during the day so that members of the class may study them at their leisure. The fee is 3 guineas, and an application has been made to the Ministry of Health to allow the course to rank for grant. Application should be addressed to the hon. secretary, Post-graduate Courses, Joint Tuberculosis Council, at the Larches, Farnham Royal, Bucks.

MEDICAL OFFICERS OF SCHOOLS ASSOCIATION.—A general meeting of this association will be held at 11, Chandos-street, Cavendish-square, London, W., on Friday, Nov. 11th, at 5 P.M. (tea 4.30 P.M.). Mr. W. Rowley Bristow will read a paper on the Commoner Disabilities of Bones and Joints in Adolescence.

CHADWICK PUBLIC LECTURES.—On Thursday, Nov. 10th, and Tuesday, Nov. 22nd, at 8.15 P.M., at the Lecture Hall of the Royal Society of Arts, John-street, Adelphi, London, Major Harry Barnes will give two lectures on the History of Housing. The first will deal with the period before 1885.

ROYAL NATIONAL ORTHOPÆDIC HOSPITAL.—Mr. Herbert E. West, the deputy chairman, has been elected chairman in succession to the Earl of Denbigh, who recently resigned. Mr. West has been associated with the hospital for many years and is chairman of Prince Henry's Special Committee which is raising money for extensions.

LEAGUE OF RED CROSS SOCIETIES.—The annual meeting of the Council of the International Union against Tuberculosis was held in Paris on Sept. 28th. Ten countries sent delegates—namely, Austria, Belgium, France, Germany, Great Britain, Italy, Monaco, Norway, Poland, and Switzerland. Finland and Bulgaria have now joined the Union, which includes 34 countries. The sixth conference will be held at Rome in September, 1928.

SMOKE INSPECTION.—The Ministry of Health in Circular 759 suggested that the officials responsible for the abatement of smoke nuisances should be specially qualified, and that there should be special courses of training for them. With this end in view, the Royal Sanitary Institute, 90, Buckingham Palace-road, London, S.W., has arranged a course of ten lectures beginning to-day (Nov. 4th) to assist candidates preparing for the examinations of the Institute qualifying for the post of smoke inspector. The lectures cover a wide field, and include, amongst other subjects, the laws and by-laws relating to smoke; the general principles underlying the production and transmission of heat; fuels, furnaces, and chimneys; the principles and practice of stoking; the nature and composition of smoke; and its prevention in boilers, furnaces, and domestic fires. The course also includes visits to various works and institutions where demonstrations illustrating the management and working of different types of furnaces will be given. Although primarily intended for smoke inspectors the lectures are open to others.

ST. THOMAS'S HOSPITAL DINNER.—The annual dinner on Oct. 28th was the first to be held in St. Thomas's House, opposite the hospital. Sir Charles Ballance, who presided, referred to the different conditions of 50 years ago, and spoke appreciatively of Mr. le Gros Clark, Sir William Macormac, and Dr. Charles Murchison, to whom he owed a special debt. Reviewing the events of the year, he mentioned the trouble to which Dr. Percy Smith had been put in the courts to defend his professional righteousness and personal honour, and on behalf of those present offered to Dr. Smith their sincere and affectionate sympathy. Sir Arthur Stanley, the treasurer, said that St. Thomas's House was proving very popular under the wardenship of Dr. L. B. Maxwell. He hoped that old students of the hospital would look on it as their club in London. Sir Cuthbert Wallace spoke of the loss which the hospital had sustained by the death of Mr. J. E. Adams. Among other old students who had died during the year were Sir Bryan Donkin, Dr. J. R. Leeson, and Dr. J. H. Tonking, of Camborne, who had been the surgical father of Devon and Cornwall for many years. As new members of the staff he welcomed Mr. Max Page, Mr. Robinson, and Dr. Potter. The entry of new students this year had been the largest for a considerable period. After mention of the well-deserved honours recently conferred on Sir Charles Martin and Sir Farquhar Buzzard, Sir Cuthbert Wallace ended with a personal tribute to Sir Charles Ballance, speaking of the way in which he had always helped younger men, and of his patriotism and loyalty. Mr. Percy Sargent proposed the health of the guests in an amusing speech. Sir Arthur Keith, who responded, said that if 40 years ago he had been shown St. Thomas's House, and had been told it was a home of medical students, he would have thought himself in another world. There had been a revolution in the social circumstances of medicine and there was no doubt about it, they were getting much more extravagant. He had first come to St. Thomas's as a visitor on arriving in London, and from those who received him so kindly had learnt a lesson which he would never forget—that a man should never let business interfere with courtesy to strangers.

Messrs. J. and A. Churchill, medical and scientific publishers since 1825, have transferred their premises to 40, Gloucester-place, Portman-square, W.1.

PRINCE OF WALES'S HOSPITAL.—The annual dinner of the Reunion Association will be held at the Trocadero Restaurant, Piccadilly Circus, London, on Friday, Nov. 11th, at 8 for 8.15 P.M., Mr. Edward Gillespie in the chair. The Secretary of the Association is Dr. J. Browning Alexander, 42, Harley-street, W. 1.

INCORPORATED GLASGOW DENTAL HOSPITAL.—It has been decided to erect a new building for this institution at a cost of £90,000 upon a site in Renfrew-street. At a public meeting to consider the situation of the hospital, Dr. A. S. M. Macgregor, the medical officer of health, stated that the whole of the work was carried on "under conditions of gross overcrowding." The waiting-room is small and ill-ventilated, and when it is full patients have to wait on the stairs and in the street. In the main operating room the dental chairs are so closely packed that there is scarcely room to pass between them; the mechanical section is badly overcrowded, and the quarters of the dental school are insanitary.

INTERNATIONAL CONTINUATION COURSE IN PUBLIC HEALTH.—Under the auspices of the Health Organisation of the League of Nations an International Continuation Course in Public Health is being held at the house of the Society of Medical Officers of Health from Nov. 3rd until Dec. 15th. Participants nominated by the League are attending from the Continent and the British Dominions. A few tickets for the course have been offered to medical officers of health, for the use of members of their staffs who may wish to attend the lectures in which they are especially interested. Any places remaining will be allotted in order of application to those who apply for admission cards to the Executive Secretary, 1, Upper Montague-street, Russell-square, W.C. 1. The lecturers from abroad include Dr. A. Foramittie (Vienna), Prof. B. Nocht (Hamburg), Dr. Debré (Paris), Prof. G. Y. Giglioli (Florence), Prof. F. Neufeld (Berlin), Prof. Clemens Pirquet (Vienna), Dr. Haven Emerson (New York), and Dr. M. Taute (Berlin), Dr. F. G. Boudreau and Dr. M. K. Stouman, of the Health Section of the League of Nations, will also give papers.

The opening address was to be delivered by Sir George Newman, and other addresses during the course will be given by Sir George Buchanan and other senior medical officers of the Ministry of Health, Sir W. Hamer, Prof. Carl Browning, Prof. W. W. C. Topley, Surgeon Commander S. F. Dudley, Prof. E. P. Cathcart, Sir Henry Gauvain, Dr. Edward Mapother, Dr. Andrew Balfour, Prof. H. R. Kenwood, Dr. R. A. Lyster, Dr. J. J. Buchan, Dr. Charles Porter, Dr. T. H. C. Stevenson, Dr. G. F. Buchan, Dr. C. J. Thomas, Dr. W. M. Willoughby, Dr. F. C. Shrubsall, Dr. W. Allen Daley, and Lieut.-Colonel F. E. Fremantle, M.P.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL INSTITUTION, Albemarle-street, W.
TUESDAY, Nov. 8th.—5.15 P.M., Sir J. H. Parsons: Light and Sight.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-steet, W.
TUESDAY, Nov. 8th.—5 P.M., THERAPEUTICS. Paper: Dr. R. D. Lawrence: Studies of Unusual Diabetics: (*a*) An Insulin Resistant Case; (*b*) Recovery From (*t*) Pituitary Diabetes after Pregnancy. Dr. F. Parkes Weber: A Note on Artificial Cerebral Congestion against Sea-sickness. Dr. J. H. Gaddum: A Comparison of Thyroxin with some other Iodine Derivatives. Other papers will be read. 8.30 P.M., PSYCHIATRY. Presidental Address: Dr. R. L. Langdon-Down: Psychiatry and the Report of the Royal Commission.
WEDNESDAY.—5.30 P.M., SURGERY: SUBSECTION OF PROCTOLOGY. Discussion on the Treatment of Cancer of the Rectum by Radium, to be opened by Sir Charles Gordon-Watson. Those desiring to take part in the discussion should send their names to the Hon. Secretary.
THURSDAY.—8 P.M., NEUROLOGY. Clinical Meeting at the Hospital for Epilepsy and Paralysis, Maida Vale, W. 9.
FRIDAY.—5.30 P.M., CLINICAL. (Cases at 5 P.M.) Mr. C. P. G. Wakeley: Case of Fibro-cystic Disease of the Femora. Dr. Dorothy Hare: Case of Erythromelalgia. Dr. Donald Hunter: Case of Co-arctation of the Aorta. Dr. Douglas Firth: Case of Gumma of Liver with Splenomegaly. Mr. P. H. Mitchiner: Tumour of Trapezius. Dr. Adolphe Abrahams: Case of Primary Arterial Fibrosis. Dr. B. T. Parsons-Smith: Case of Intrathoracic Tumour. Other cases will be shown. 8.30 P.M., OPHTHALMOLOGY. (Cases at 8 P.M.) Cases: Mr. A. C. Hudson: A Case of Congenital Dislocation of Both Lenses Treated by Iridotomy. Mr. P. G. Doyne: Two Cases of Macular Degeneration. Communications, &c.: Mr. O. Gayer Morgan and Dr. F. D. Howitt: The Application of Heat by Diathermy in Iridocyclitis. Dr. P. H. Adams: Two Cases of Congenital Cataract with Spontaneous Absorption of the Lens. Mr. Ernest Clarke and Dr. Rayner Batten: Drawings illustrating Toxic Hæmorrhagic Retinitis.

HUNTERIAN SOCIETY.
MONDAY, Nov. 7th.—9 P.M. (in the Cutlers' Hall, Warwick-lane, E.C.). Discussion on the Legal Perils of the Doctor, in which Earl Russell, Mr. Rayner Goddard, Dr. James Neal, Sir Herbert Waterhouse, and Dr. Temple Grey will take part.

BIOCHEMICAL SOCIETY.
MONDAY, Nov. 7th.—5 P.M. (in the National Institute for Medical Research, Hampstead, N.W.). Communications: M. Stephenson: On a Cell-free Dehydrogenase Obtained from Bacteria. G. A. Harrison: The Cause of Andrewes' Diazo Test for Uræmia. A. Harden and F. R. Henley: The Equation of Alcoholic Fermentation. W. V. Thorpe: Presence of Histamine in Tissue Extracts. O. Rosenheim: Note on the Fluorescence of Ergosterol and its Cause. M. G. Eggleton and P. Eggleton: A Few Observations Concerning Phosphagen. Demonstrations: J. T. Irving: A Simple Shaker for Light Objects. O. Rosenheim and E. Schuster: A New Colorimeter based on Lovibond's Colour System.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.
TUESDAY, Nov. 8th.—5 P.M., Dr. Herbert Spencer: The History of British Midwifery from 1650 to 1800. (First FitzPatrick Lecture.)
THURSDAY, Nov. 10th.—5 P.M. (Second FitzPatrick Lecture.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn-fields, W.C.
THURSDAY, Nov. 10th.—5 P.M., Sir Cuthbert Wallace: Enlarged Prostate—A Review. (Bradshaw Lecture.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Nov. 7th, to SATURDAY, Nov. 12th.—FELLOWSHIP OF MEDICINE. Special lecture at the Medical Society, 11, Chandos-street, Cavendish-square, W., on Mon., at 5 P.M., Sir StClair Thomson: Bleeding from the Nose and Throat.—ROYAL LONDON OPHTHALMIC HOSPITAL, City-road, E.C. Special demonstration on Wed., at noon, by Mr. Greeves.—ST. MARY'S HOSPITAL, Paddington, W. Wed., at 3 P.M., special demonstration by Sir William Willcox.—CANCER HOSPITAL, Fulham-road, S.W. Thurs., at 3 P.M., special demonstration by Mr. Cecil Rowntree. All the above are free to the medical profession.—BROMPTON HOSPITAL FOR DISEASES OF THE CHEST, Brompton, S.W. Special course for one week. Instruction in all departments.—HAMPSTEAD GENERAL HOSPITAL, Haverstock-hill, N.W. General practitioners' course—second week—4.30 to 6 P.M. daily. Further information from the Secretary, Mayfair 2236.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, Nov. 7th.—2.30 P.M. to 5 P.M., Medical, Surgical, and Gynæcological Clinics. Operations.
TUESDAY.—2.30 P.M. to 5 P.M., Medical, Surgical, Throat, Nose, and Ear Clinics. Operations.
WEDNESDAY.—2.30 P.M. to 5 P.M., Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M., Dental Clinic. 2.30 P.M. to 5 P.M., Medical, Surgical, and Ear, Nose, and Throat Clinics. Operations.
FRIDAY.—10.30 A.M., Throat, Nose, and Ear Clinics. 2.30 P.M. to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.
There will also be a special demonstration of dermatological cases at 2 P.M. on Wednesday, and of surgical cases on Friday, at 2 P.M., by Dr. W. Jenkins Oliver and Mr. E. Gillespie respectively.

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith-road, W.
MONDAY, Nov. 7th.—10 A.M., Dr. Dowling: Skin Department. 2 P.M., Mr. Donald Armour: Operations. 2 P.M., Dr. Ironside: Medical Out-patients.
TUESDAY.—11 A.M., Mr. Endean: Venereal Diseases. 2 P.M., Mr. Addison: Operations. 4.30 P.M., Dr. Owen: The Heart in Childhood.
WEDNESDAY.—10 A.M., Dr. Burnford: Medical Wards. 2 P.M., Mr. Tyrrell Gray: Operations. 2 P.M., Dr. Scott Pinchin: Medical Out-patients.
THURSDAY.—11 A.M., Resident Assistant Surgeon: Ward Demonstration. 2 P.M., Mr. Bishop Harman: Eye Department. 3 P.M., Sir Henry Simson: Gynæcological Ward Visit.
FRIDAY.—11 A.M., Dr. Pritchard: Modern Methods in Medicine. 2 P.M., Dr. Shaw: Medical Out-patients. 2 P.M., Mr. Vlasto: Throat, Nose, and Ear Department.
SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy Department. 10 A.M., Dr. Owen: Medical Diseases of Children.
Daily, 10 A.M. to 5 P.M., Saturdays, 10 A.M. to 1 P.M., In- and Out-patients, Operations, Special Departments.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James's Hospital, Ouseley-road, Balham.
WEDNESDAY, Nov. 9th.—4 P.M., Mr. V. Z. Cope: Clinical Demonstration of Surgical Cases.

ROYAL NORTHERN HOSPITAL, Holloway, N.: POST-GRADUATE COURSE.
TUESDAY, Nov. 8th.—3.15 P.M., Dr. Malcolm Donaldson: Antenatal Care.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Nov. 10th.—4 P.M., Dr. W. W. Payne: The Value of Blood-sugar Estimation in Diagnosis and Treatment.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
TUESDAY, Nov. 8th.—5 P.M., Dr. H. MacCormac: Diseases due to Animal Parasites.
THURSDAY.—5 P.M., Dr. W. J. O'Donovan: Occupational Dermatitis.

ANCOATS HOSPITAL (Mill-street, Manchester) POST-GRADUATE LECTURES.
THURSDAY, Nov. 10th.—4.15 P.M. (tea at 3.45 P.M.), Mr. E. E. Hughes: Some Remarks on Gall-stones.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, Nov. 8th.—4.15 P.M., Mr. F. G. Wrigley: Acute Otitis Media.
FRIDAY.—4.15 P.M., Mr. J. Spalding: The Education of the Deaf Child and the Work Done in the Manchester Schools.

UNIVERSITY OF SHEFFIELD POST-GRADUATE CLINICS.
FRIDAY, Nov. 11th.—3.30 P.M., Mr. Garrick Wilson: Surgical Cases.

JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH, St. Andrews.
TUESDAY, Nov. 8th.—4 P.M., Prof. J. Charteris: Pharmacological Principles in Relation to Common Gastro-intestinal Ailments. Discussion to be opened by Dr. W. F. Mair.
FRIDAY.—4 P.M., Case reading and discussion, in which all medical practitioners are invited to take part.

PEOPLE'S LEAGUE OF HEALTH.
THURSDAY, Nov. 10th.—6 P.M. (at 11, Chandos-street, Cavendish-square, W.), Dr. H. Gardiner-Hill: Internal Secretions as Factors in Nutrition.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.
WEDNESDAY, Nov. 9th.—4 P.M., Lt.-Col. F. E. Fremantle, M.P.: The Present Situation in Regard to Housing.

CHADWICK PUBLIC HEALTH LECTURES.
THURSDAY, Nov. 10th.—8.15 P.M. (at the Royal Society of Arts, John-street, Adelphi, W.C.), Maj. Harry Barnes, F.R.I.B.A.: Housing before 1885 (first of two lectures on History of Housing).

Appointments.

King's College Hospital and Medical School: WILLIAMS, R. P., M.D. Lond., D.P.H. Oxf., Lecturer in Hygiene; LIVINGSTONE, J. L., M.D., M.R.C.P., Demonstrator in Pathology; EAST, C. F. T., M.D. Oxf., F.R.C.P. Lond., Medical Tutor; EDWARDS, H. C., M.B. Lond., F.R.C.S. Eng., Surgical Tutor; SAUNDERS, R. M., M.B., Ch.B. Edin., Obstetrical Tutor and Obstetric Registrar; LUCAS, H. A., M.R.C.S., L.R.C.P. Lond., Pathological Tutor; BICKERTON, J. M., M.B. Oxf., F.R.C.S. Eng., Ophthalmic Tutor; NEWMAN, C. E., M.B., B.Ch., M.R.C.P. Lond., Medical Registrar; BELL, J. G. Y., M.B., B.S. Lond., Surgical Registrar; WOOD, H. L. C., M.B., B.S., RUTHERFORD, R., M.R.C.S., L.R.C.P. Lond., COGSWELL, A. P., M.R.C.S., L.R.C.P. Lond., DALZELL, A. C., M.B., B.S., BATTEN, G., B.M., B.Ch., HOLLINS, A. S., M.R.C.S., L.R.C.P. Lond., BUTLER, E. N., B.M., B.Ch., GOLDBY, F., M.R.C.S., L.R.C.P. Lond., BOCKETT, E. J. C., M.R.C.S., L.R.C.P. Lond., KENDALL, A. W., M.R.C.S., L.R.C.P. Lond., WAKELEY, L. S. P., M.R.C.S., L.R.C.P. Lond., NEWMAN, J. L., M.R.C.S., L.R.C.P. Lond., DAUNCEY, K. E. D., M.R.C.S., L.R.C.P. Lond., LIVINGSTONE, G. H., M.R.C.S., L.R.C.P. Lond., and BOWIE, E. D., M.B., B.S., Resident Medical officers; MACHUGH, M. A. C., M.R.C.S., L.R.C.P. Lond., Junior House Anæsthetist; CUMINGS, J. N., M.R.C.S., L.R.C.P. Lond., HUMPHREYS-OWEN, I. R., M.R.C.S., L.R.C.P. Lond., MAY, K. S., M.R.C.S., L.R.C.P. Lond., and MACMYN, D. J., M.R.C.S., L.R.C.P. Lond., Assistant Casualty Officers.

Certifying Surgeons under the Factory and Workshop Acts: BROWN, A. C., M.D., Ch.B. Edin. (Ripon District of the County of York, West Riding); MORRIS, J. W., L.R.C.P., L.R.C.S. Edin., L.R.F.P.S. Glasg. (Festiniog District of the County of Merioneth); and SOMERVILLE, I. F., M.B., Ch.B. Glasg. (Beith District of the County of Ayr).

Vacancies.

For further information refer to the advertisement columns.

Birmingham City Education Committee.—Asst. Sch. M.O. £600.
Birmingham and Midland Ear and Throat Hospital.—Surg. and Asst. Surg.
Bournemouth, County Borough.—M.O.H. £1000.
Bristol General Hospital.—Hon. Surg. Reg. Also Hon. Asst. P.
Burton-on-Trent, Bretby Hall Orthopædic Hospital.—Res. M.O. £450.
Buxton, Devonshire Hospital.—Bacteriologist. £400.
Cairo, Egypt, Girls' Schools under the Ministry of Education.—Asst. Med. Inspector. L.E.480.
Canterbury Borough Mental Hospital.—Asst. M.O. £350.
Cardiff University College of South Wales and Monmouthshire.—Professor of Pathology and Bacteriology. £1500.
Central London Throat, Nose, and Ear Hospital.—Second Res. H.S. At rate of £75.
Croydon County Borough.—M.O.H. £1300.
Dreadnought Hospital, Greenwich.—Med. Supt. £300.
Durham County and Sunderland Eye Infirmary.—Locum.
Ealing Borough.—Asst. M.O.H. £600.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—Phys. Also Asst. Phys.
Elizabeth Garrett Anderson Hospital, 144, Euston-road, N.W.—H.P., Obstet. Asst., 2 H.S.'s. Each at rate of £50. Also Clin. Assts.
Hampstead General and North-West London Hospital, Haverstock-hill, N.W.—H.S. At rate of £100.
Ipswich, East Suffolk Administrative County of.—Asst. County M.O.H. £600.
Italian Hospital, Queen-square, W.C.—Hon. Surg. to Throat, Nose, and Ear Dept. Also Asst. Anæsthetist.
Kingston-on-Thames, Surrey County Mental Hospitals.—Third Asst. M.O. £300.
Leeds, Tuberculosis Sanatorium, Killingbeck.—Asst. Res. M.O. £250.
Lewisham, Metropolitan Borough of.—M.O.H. £1100.
Liverpool Maternity Hospital, Oxford-street.—H.S. At rate of £90.
London Jewish Hospital, Stepney Green, E.—Res. M.O. Also Jun. Res. M.O. At rate of £150 and £100 respectively.
Middlesex Hospital, W.—Res. M.O. £400. Also Asst. Radiologist. £150.
Middlesex Hospital Medical School.—Two Surgical and one Medical Registrar. Each £300.
New Zealand Research Laboratories.—Dairy Research Bacteriologist. £850.
Nigeria.—Four M.O.'s for Tsetse Fly Investigation. Each £660.
North Middlesex Hospital, Edmonton, N.—Visiting Throat Surg. Three guineas per session.
Norwich, Norfolk and Norwich Hospital.—H.S. £120.
Poplar Hospital for Accidents, East India Dock-road, E.—Second Res. O. £175.
Royal Free Hospital, Gray's Inn-road, W.C.—Two Assts. to M.O. in charge of V.D. Dept. Each £500.
Royal Northern Hospital, Holloway, N.—Asst. Radiologist. £140.
St. Albans and Mid-Herts Hospital and Dispensary.—Res. M.O. £150.
St. John's Hospital, Lewisham, S.E.—Gynæcologist to Out-patients.
St. Mary Abbots Hospital, Kensington.—Med. Sec. and Registrar. £300. Also two Asst. M.O.'s. Each £250.
Sierra Leone, School Laboratory, Freetown.—Two Research Assts. Each £600.
Southampton, Royal South Hants and Southampton Hospital.—Cas. O. £120.
Surrey County Council.—Asst. M.O.'s. Each £600.
Swansea Hospital.—H.S. to Ophth. and Aural Depts. £150–£200.
Warwick County Mental Hospital, Hatton.—Asst. M.O. £300.
Westminster Hospital, Broad Sanctuary, S.W.—Asst. P.
Worcester General Infirmary.—Jun. Res. M.O. £120.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Lydbrook (Gloucestershire).

Births, Marriages, and Deaths.

BIRTHS.

HOME.—On Oct. 21st, at Grosvenor-street, Edinburgh, the wife of Dr. Bruce F. Home, West African Medical Service, of a daughter.

NEAME.—On Oct. 25th, at Greenheyes, Buckhurst Hill, the wife of C. Stanley Neame, L.D.S. R.C.S. Eng., of a son.

MARRIAGES.

LOUGHNANE—KEATINGE.—On Oct. 29th, at the Brompton Oratory, Farquhar MacGillivray Loughnane, F.R.C.S., Welbeck-street, to Blanca Keatinge, of Nottingham-place, W.

STRACHAN—FORSYTH.—On Oct. 26th, at St. John's Episcopal Church, Dumfries, Frederick James Strachan, *M.C.*, M.B., B.S., to Olga Marie, youngest daughter of the late William Forsyth, Kilmarnock.

SUMMERS—BAIRD.—On Oct. 27th, at St. Peter's Church, Burnham, Bucks, by Rev. Percy Nott, M.A., Maxwell Hamilton Summers, M.R.C.S., L.R.C.P., to Evelyn Elizabeth Baird, M.A., M.B., Ch.B.

DEATHS.

CHOLMELEY.—On Sunday, Oct. 30th, Henry Patrick Cholmeley, M.D., at Forest Edge, Forest Row, Sussex, aged 68.

DAY.—On Oct. 27th, at Harlow, Essex, Thomas Montagu Day, M.R.C.S., L.R.C.P.

EVANS.—On Oct. 25th, at Glanfraed, Brundall, Norfolk, Henry William Evans, *M.C.*, M.D. Lond.

WALSH.—On Oct. 26th, at Thelsford Farm, Wellesbourne, near Warwick, F. Newton Walsh, B.S., M.R.C.S., L.R.C.P. Lond., of Douglas-road, Handsworth, Staffs.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

ARTIFICIAL DEFORMATION OF THE SKULL:

A SUGGESTION AS TO THE ORIGIN OF THE CUSTOM.

BY WARREN R. DAWSON, F.S.A. SCOT.

THE head of the Egyptian King Amenophis IV. (c. 1375–1350 B.C. Eighteenth Dynasty), who is usually known by the name he assumed after his great religious revolution—Akhenaten—is always represented on his monuments as having a peculiarly elongated form, whilst the rest of his body is feminine in contour. As one of the results of his reformation, Egyptian art during Akhenaten's reign underwent great changes, and the singular bodily form of the King as portrayed on his monuments has always been supposed to be no more than one of the novel conventions of the new art. In 1907 a tomb was discovered and announced as that of Queen Tiy, Akhenaten's mother. In the tomb the remains of a mummy were found, but owing to the penetration of moisture into the chamber, the soft parts had entirely decayed leaving nothing but the skeleton. When these bones were examined by Prof. Elliot Smith he found them to be those, not of an elderly woman, but of a young man. Archæological evidence was soon forthcoming to show that the tomb had been wrongly identified as that of Queen Tiy, and no doubt remained that the burial was really that of Akhenaten himself.

The skeleton proved to be one of exceptional interest, and a detailed description of it was published by Prof. Elliot Smith in his monograph, *The Royal Mummies* (pp. 51–57), in 1912. He came to the conclusion that the skull exhibited signs of hydrocephalus, a view that was confirmed by Prof. A. R. Ferguson, who pronounced the evidence of hydrocephalus to be quite unmistakable. Akhenaten had other pathological peculiarities, and it now seems very probable that he was a case of the syndrome described by Fröhlich in 1900, now known as dystrophia adiposogenitalis, with which hydrocephalus is often associated.[1]

Now it is a very curious fact that the infant daughters of this King (he had no sons)[2] are always represented on contemporary monuments with heads of a very peculiar shape, and, as in the case of Akhenaten himself, this had hitherto been held to be no more than a convention arising out of the novel artistic concepts which came into vogue at the time. In 1924 Prof. Elliot Smith expressed the view that the childrens' heads might have been subjected to the process of artificial deformation.[3] At the time this suggestion was advanced he was not aware that the material for solving the mystery was already in existence, for in 1918 Dr. George Sobhy, of Cairo, published photographs and a description of the head of a female mummy from Tell el Amarna (Akhenaten's capital), and of the period of that reign.[4] When the flesh and resin had been removed and the skull cleaned, its shape shows without any doubt that it had been artificially deformed. Dr. Sobhy made a restoration of the head and features from the measurements of the skull, and the result exactly resembles the form of the head in the portraits and statues of Akhenaten's daughters.

There is no evidence to prove whether or not this skull belonged to a member of Akhenaten's family, but it does at least prove that artificial deformation was being practised in Egypt during his time, and suggests that the form of Akhenaten's head, pathologically deformed by nature, may have been deliberately copied by artificial means in the case of his daughters. Egypt at the time set the fashions which were copied wherever her influence extended, and it is extremely likely that such an innovation would have been imitated in Western Asia.

This point lends particular interest to the account given by Hippocrates of the "Longheads" of Asia Minor. He distinctly tells us that these people remodelled by hand the heads of their children immediately after birth, and that they forced the skull to increase in length by the use of bandages and suitable appliances.[5] Hippocrates goes on to say that this peculiar form of head, originally produced by art, became natural, and that long-headed parents had long-headed children. We need not, however, discuss this insistence upon the false supposition of the inheritance of acquired characters, as this does not now concern us, but we may note that he concludes by saying that the custom had become less frequent than formerly. This definite evidence of cranial deformation in Asia Minor before the fifth century B.C. is of great interest, especially as Hippocrates implies that it was an ancient custom already becoming obsolescent in his time.

In later times, as is well known, the custom of deforming the skull acquired a wide geographical distribution, and it is very significant that it occurs almost always in association with megalith-building, mummification, and various other singular customs and beliefs which follow the "heliolithic track" round the world. Cranial deformation has been recorded from various parts of Europe and Western Asia, from Malaya, Indonesia, Melanesia, Southern North America, Central America, and South America (where the mummies of Peru have provided numerous examples), and elsewhere.

The facts, therefore, seem very suggestive of the interpretation that the custom had its origin in Egypt in the fourteenth century B.C., during the reign of Akhenaten, and thence spread, with mummification and other practices of admitted Egyptian origin, till it encircled the world.

[1] Cambridge University Medical Society Magazine, 1926, iv., 37.
[2] The suggestion has recently been made that Tutankhamen may have been the son of Akhenaten by a secondary wife, but there is as yet no evidence to prove this.
[3] Elliot Smith and Dawson: Egyptian Mummies, London, 1924, p. 96.
[4] Bulletin de l'Institut Français d'Archéologie Orientale, 1918, xiv., 64, and one plate.
[5] Airs, Waters, Places, xiv.

THE PATHOLOGY OF ELECTRIC SHOCK.

SINCE the first fatality from industrial electricity in 1879, there has been much research into the exact cause of death by electrocution, and it has been shown that artificial respiration is of vital importance as a means of treatment. Nearly every industry in which electricity is used now trains its employees in preventive measures and in first-aid, but the number of casualties continues to rise, partly because the known methods of resuscitation are not immediately applied. In an endeavour to reduce the mortality from these accidents, the Hydro-Electric Power Commission of Ontario initiated a research into the physiopathology of electric shock, under the direction of Prof. J. J. R. Macleod, of the University of Toronto, and an account of the inquiry appeared in the *Journal of Industrial Hygiene* for April.

It is well known that one of the important effects of electric shock is to throw the heart into fibrillation, and rabbits were selected for most of the experiments because their hearts are relatively difficult to affect in this way. The equipment allowed of any variation in the current, and of its accurate measurement. In the first group of 33 rabbits, alternating currents varying from 1000 to 2200 milliampères were sent from the occiput to a hind leg, since previous observers had noted that this path usually missed the heart but caused disturbances in the brain and spinal cord. Nine began to breathe again spontaneously, six were restored by artificial respiration, and 18 died. In nine of these 18, the heart stopped beating within one minute of the cessation of the current, and in the remainder it continued for periods varying from two to nine minutes. The investigator, Dr. R. W. I. Urquhart, concluded that the heart was injured in 45 per cent. of the cases, and that it is impossible to predict whether, when a current passes the length of the body, the heart will be affected or not. A second series of 36 animals was subjected to the passage of currents of 500 to 1600 milliampères between the upper nostril and the exposed occipito-atloid ligament, so that the vital centres of the brain would alone be involved. These animals were anæsthetised, but the "eye reflex" was obtained before the current was passed. In any case the evidence goes to show that anæsthesia has no protective value. The result in 18 cases was death from asphyxia, with no evidence of fibrillation or gross injury, and 18 others recommenced breathing spontaneously. There was a more or less definite borderline between fatal and non-fatal currents at 600 to 700 milliampères, but with a smaller electrode lesser currents were required to produce fatal apnœa. This was probably because of a concentration effect.

Another significant experiment showed that 25 out of 30 animals could be revived after a shock which was severe enough to kill if they had been left alone. The five that died had all suffered gross damage to the spinal cord or the medulla, and the occipito-atloid ligament had been badly charred. Prompt and efficient artificial respiration, says Dr. Urquhart, nearly always saved the animal if started within five or six minutes of the shock, but after a longer interval the damage to the heart was irremediable. It was found necessary to continue the artificial respiration for a long time after natural breathing appeared. In contradiction of the popular belief in "counter-shock" as a restorative measure, no kind of stimulation had any effect in hastening recovery, and it was impossible to detect any reflex effects even from faradic shocks of the central end of the sciatic nerve. In addition to graphical records of blood pressure, direct observation was maintained on the heart

through a window in the chest wall, and it was seen to be inhibited completely in rabbits and dogs, and almost completely in cats. That the inhibition is due to stimulation of the vagus centres was proved by its great reduction when the vagi were severed and its complete absence when they were controlled by atropine, which would paralyse the extravagal inhibitory fibres as well. Moreover, the current itself causes a complete block at the vagal nerve-centre, so that no stimulation of it affects the blood pressure. No relation could be made out between the severity of the shock and the appearance of capillary hæmorrhages in various parts of the brain, and Dr. Urquhart considers that they are probably due to the sudden great increase in blood pressure which follows the passage of the current. They occur in survivors as well as in the dead, and are probably, he says, not an important factor in death from electricity.

The result of the whole inquiry is to throw even more stress on the importance of artificial respiration, particularly by the prone pressure method, and to the necessity of beginning it immediately and continuing it until recovery or decisive evidence of death. The ordinary tests for death are invalidated by the block in the nerve-centres, and no pains should be spared until the body cools or rigor mortis sets in.

Prof. Stefan Jellinek, writing in the *Medizinische Klinik* for Sept. 23rd, states that most fatalities from electric shock are due to faulty restorational technique. No injury, he says, has ever been found post mortem that would account for death, and the immediate effects of the shock are purely functional. He is very strongly in favour of wider instruction in artificial restoration, and of the provision of fully equipped restoration centres at mines, works, and all places where electrical accidents are likely to occur. Severe symptoms at first give the best prognosis, and immediate death is as a rule merely apparent. He recommends conservative treatment. Operation on damaged parts of the body is, he says, contra-indicated for two reasons: one is that the extent of the injury does not become obvious for some weeks, and the other is that from the end of the first week the vessels rupture easily and the hæmorrhages are very troublesome to staunch. Nevertheless, there are two exceptions to this. An emergency lumbar puncture is indicated when the patient shows symptoms of pressure in the brain, which may occur some hours after the accident, and hæmorrhage of the larger vessels a month or so later may call for immediate ligation if the patient's life is to be saved.

According to Prof. Jellinek the micropathological changes, as observed in the skin at the site of an electrical lesion, are a compression of the horny layer into an homogeneous plaque, and an ironing-out of the underlying papillary processes. Occasionally fissures and hollows appear between the corneum and germinativum, but this is not invariable, and the surest sign that an electric current has passed is the coalescence into a star-shaped or rod-like structure of the basal cells in each group of the rete Malpighii. The lesion is not a burn, and none of the surrounding structures are altered. It heals without infiltration, suppuration, or pyrexia, but when tendons, joints, and large areas are involved there may be some aseptic necrosis, and it is presumably this change which accounts for the hæmorrhages which sometimes complicate recovery. Macroscopically the appearance of the skin, when anything is to be seen at all, is a greyish-white patch slightly hard to the fingers, often with an umbilicated notch or dimple.

AN ENGLISH-SPANISH MEDICAL DICTIONARY.

A CORRESPONDENT asks to have recommended to him a good English-Spanish medical dictionary, but it appears that there is no such work that is properly inclusive and completely trustworthy. Our correspondent may be advised to obtain the "Medical Pocket Dictionary in Eight Languages" (including Spanish)." (Berlin: Urban and Schwarzenberg (obtainable in London from Messrs. Williams and Norgate, 14, Henrietta-street, Covent Garden, W.C. 2, at 22s. 6*d.*)). "Terminologia Medica Polyglotta (including Spanish)," by the late Dr. Theodore Maxwell in the year 1890 (London: J. and A. Churchill, 7, Great Marlborough-street, W. 1, 16*s.*), was a good book in its time, but is, we believe, now out of print; and, of course, was tabulated and concise only, without detailed explanations. It might be worth while to refer to Manuel Marin, publisher, 273 Provenza, Barcelona, Spain, who published under the editorship of Dr. Alfonso Arteaga Pereira in 1918 a full translation into Spanish of an English medical annual and must be acquainted therefore with the many terms in both languages (the annual was intended to be continued). Our correspondent might also inquire in the United States from the Secretary of the American Medical Association, 535, North Dearborn-street, Chicago. Some years ago the United States authorities, in connexion with their administration of Manila, published elaborate tables of diseases and causes of death in parallel columns, English and Spanish, which could serve as a dictionary perhaps for many terms.

PRESENTS AND "TIPS" IN NURSING HOMES.

To the Editor of THE LANCET.

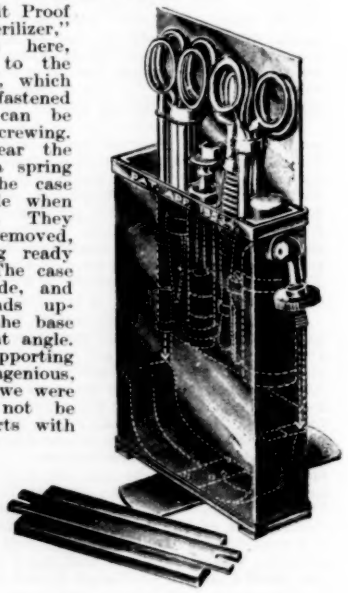
SIR,—For many middle-class patients the expenses at private nursing homes in our large towns are a very heavy burden. But they are a burden which must be borne until more of our large hospitals establish pay wards. In some nursing homes (in what proportion I am unable to state) it is usual for patients, on leaving the home, to give presents to the nurses and "tips" to the servants. Such presents and tips are an additional heavy burden to many middle-class patients, and except in special circumstances they should be unnecessary. To the writer it appears very desirable that this custom should not become general. Medical men by doing what they can to oppose the custom would help to diminish the expenses at nursing homes.

In one of the instances, in which I know all details, the presents to nurses and tips to servants, given by a patient (not wealthy) on leaving a London nursing home, reached (at the suggestion of the matron) the sum of £13. Wealthy patients should remember that by giving large presents and tips they are helping to establish a custom which is a heavy burden for most patients. It is to be hoped that both general practitioners and consultants will, at least, do what they can to oppose the custom of giving presents to nurses.

I am, Sir, yours faithfully,

PHYSICIAN.

A POCKET INSTRUMENT CASE.



THE "Security Spirit Proof Emergency Pocket Sterilizer," which we illustrate here, should be of value to the practitioner. The lid, which is seen detached, is fastened by two bolts and can be removed without unscrewing. The plates which bear the instruments rest on a spring at the bottom of the case and therefore protrude when the lid is taken off. They can thus be easily removed, the instruments being ready for immediate use. The case is compact, well made, and watertight, and stands upright on a foot at the base which turns to a right angle. The method of supporting the instruments is ingenious, though in the model we were shown they could not be fixed to their supports with perfect security. The "Sterilizer," without instruments, is obtainable from the sole distributor, Charles F. Thackray, Park-street, Leeds, and 119, High Holborn, London, W.C. 1, at a cost of £1 2*s.* (postage extra).

The Longevity of Cricketers.—In our editorial comment last week on Dr. Bradford Hill's analysis of the duration of life in cricketers there was an obvious misprint. He was, of course, dealing with "cricketers of British nationality born *before* 1888."

Messrs. Baillière, Tindall and Cox, 7 and 8, Henrietta-street, W.C., have issued a catalogue (dated October, 1927) of publications in medicine and allied sciences. The first section of the catalogue, which runs to 39 pages, deals with books of medicine, dentistry, or nursing published during the last ten years or so, the large majority quite recently, the date of publication being given in each instance. There are a few announcements of books in preparation. A convenient index of both subjects and authors precedes the catalogue.

Deaths from Infectious Disease in England and Wales during the Week ended Oct. 1st, 1927.—These figures were inadvertently omitted in our issue of Oct. 15th. They should run as follows: In the aggregate of great towns, including London, there was no death from small-pox, 5 (1) from enteric fever, 9 (1) from measles, 2 (0) from scarlet fever, 10 (0) from whooping-cough, 20 (4) from diphtheria, 94 (21) from diarrhœa and enteritis under two years, and 34 (5) from influenza. The figures in parentheses are those for London itself. The number of stillbirths registered during the week was 258 in the great towns, including 57 in London.